Installation Guide

HP StorageWorks ESL9000 Series Pass-through Mechanism (PTM)

Sixth Edition (July 2004)

Part Number: 243492-006

This guide describes procedures for installing and configuring the HP StorageWorks ESL9000 Series pass-through mechanism.

Printed in the U.S.A.

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Contents

About this Guide

This installation guide provides information to help you:

- Install a pass-through mechanism (PTM) for HP StorageWorks ESL9000 Series tape libraries.
- Configure a PTM for HP StorageWorks ESL9000 Series tape libraries

"About this Guide" topics include:

Related documentation

In addition to this guide, HP provides corresponding information:

- *HP StorageWorks ESL9000 Series Tape Library User Guide*
- *HP StorageWorks ESL9000 Series Maintenance and Service Guide*

Conventions

Conventions consist of the following:

- Document conventions
- Text symbols
- Equipment symbols

Document conventions

The document conventions included in Table 1 apply.

Table 1: Document conventions

Element	Convention
Cross-reference links	Blue text: Figure 1
Key and field names, menu items, buttons, and dialog box titles	**Bold**
File names, application names, and text emphasis	*Italics*
User input, command and directory names, and system responses (output and messages)	`Monospace font` `COMMAND NAMES` are uppercase monospace font unless they are case sensitive
Variables	*`<monospace, italic font>`*
Website addresses	Blue, underlined sans serif font text: http://www.hp.com

Text symbols

The following symbols may be found in the text of this guide. They have the following meanings.

WARNING: Text set off in this manner indicates that failure to follow directions in the warning could result in bodily harm or death.

Caution: Text set off in this manner indicates that failure to follow directions could result in damage to equipment or data.

Note: Text set off in this manner presents commentary, sidelights, or interesting points of information.

Equipment symbols

The following equipment symbols may be found on hardware for which this guide pertains. They have the following meanings.

Any enclosed surface or area of the equipment marked with these symbols indicates the presence of electrical shock hazards. Enclosed area contains no operator serviceable parts.

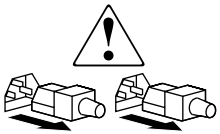
WARNING: To reduce the risk of personal injury from electrical shock hazards, do not open this enclosure.

Any RJ-45 receptacle marked with these symbols indicates a network interface connection.

WARNING: To reduce the risk of electrical shock, fire, or damage to the equipment, do not plug telephone or telecommunications connectors into this receptacle.

Any surface or area of the equipment marked with these symbols indicates the presence of a hot surface or hot component. Contact with this surface could result in injury.

WARNING: To reduce the risk of personal injury from a hot component, allow the surface to cool before touching.



Power supplies or systems marked with these symbols indicate the presence of multiple sources of power.

WARNING: To reduce the risk of personal injury from electrical shock, remove all power cords to completely disconnect power from the power supplies and systems.

Any product or assembly marked with these symbols indicates that the component exceeds the recommended weight for one individual to handle safely.

WARNING: To reduce the risk of personal injury or damage to the equipment, observe local occupational health and safety requirements and guidelines for manually handling material.

Rack stability

Rack stability protects personnel and equipment.

WARNING: To reduce the risk of personal injury or damage to the equipment, be sure that:

- The leveling jacks are extended to the floor.
- The full weight of the rack rests on the leveling jacks.
- In single rack installations, the stabilizing feet are attached to the rack.
- In multiple rack installations, the racks are coupled.

Getting help

If you still have a question after reading this guide, contact an HP authorized service provider or access our website: http://www.hp.com.

HP Technical Support

Note: For continuous quality improvement, calls may be recorded or monitored.

Call technical support at the nearest location. Telephone numbers for worldwide technical support are listed on the HP website under support: http://www.hp.com/support.

Be sure to have the following information available before calling:

- Technical support registration number (if applicable)
- Product serial numbers
- Product model names and numbers
- Applicable error messages
- Operating system type and revision level
- Name and revision of application software

HP Storage website

The HP website has the latest information on this product, as well as the latest drivers. Access storage at: http://www.hp.com/products/tapestorage. From this website, select the appropriate product or solution.

HP authorized reseller

For the name of your nearest HP authorized reseller:

- In the United States, call 1-800-345-1518.
- In Canada, call 1-800-263-5868.
- Elsewhere, see the HP website for locations and telephone numbers: http://www.hp.com/support.

Introduction

1

The HP StorageWorks ESL9000 Series pass-through mechanism (PTM) enables the transfer of a single tape cartridge between two HP StorageWorks ESL9000 Series Tape Libraries. Any combination of ESL9000 Series libraries can be connected as long as the total number of elements does not exceed 2500, or 5 library cabinets. This includes the robotics/picker (medium transport element), drives (data transfer elements), slots (storage elements), and load port (import/export element).

Caution: If any library is to utilize Multi-Unit (MUSL) functionality, all libraries must be running firmware 3.10 or later. In order to utilize MUSL functionality, all libraries must have the proper backplanes (PN 6310520-04 or newer), proper robotic controller boards (PN 6221710-21 or newer) and QSPI cables.

All libraries running firmware 1.30 or earlier that upgrade to 3.10 or later that will utilize MUSL functionality with another library must reinitialize NV RAM and use the new memory module (PN 6312910-06). To support the new memory module, boot block version 2.01 must be installed. If a library is configured in Single mode, then there is no need to upgrade the boot block or memory module, but the NV RAM must still be reinitialized.

Ensure you understand the capabilities of your application software before enabling autoclean. If the tape drive autoclean feature is to be supported, be sure that at least one cleaning tape exists in each library that will support autocleaning.

Before connecting any libraries together, check with your software application vendor to ensure that the application will work with scaled libraries and the higher element count.

The PTM installation procedure consists of the following steps:

- Preparing for installation, page 13
- Attaching the libraries, page 18
- Installing the PTM, page 28
- Installing library cosmetics, page 58
- Cabling the PTM, page 64
- Configuring and Calibrating a PTM, page 67

Preparing for installation

Before beginning the installation procedure:

1. Verify the packing slip for all required tools.
2. Make sure that you have the required upgrade parts and tools. One upgrade kit is required for this procedure.
3. Make sure the library is functional by running **SysTest** from the **Operator** control panel (refer to the *HP StorageWorks ESL9000 Series Tape Library User Guide*).
4. Perform a calibration and inventory using the **Operator** control panel (refer to the *HP StorageWorks ESL9000 Series Tape Library User Guide*).

PTM upgrade parts

Table 2 lists the parts included in the PTM upgrade kit:

Table 2: PTM upgrade parts

Part number	Quantity	Description
6312661	1	PTM assembly
6312026	1	Lower cabinet attachment channel
6312027	1	Upper cabinet attachment plate
6312028	2	Upper cabinet spacer plate
0685521	8	Washers .265 x 0.87 x 0.090
0615113	8	Screws 1/4C x 0.75 (black)
0615112	16	Screws 1/4C x 0.75
6310881	1	Interconnect cable
6310876	2	Queued Serial Peripheral Interface (QSPI) terminator
6316323	1	Right side plate adapter *(For ESL9198 and ESL9322 only)*
6316341	1	PTM cable cover
0615018	6	Screws SMPC 6C x 0.312
6316342	1	Bin shelf opening cover
0685553	9	Push-in clips

Table 2: PTM upgrade parts (Continued)

Part number	Quantity	Description
6433019	1	PTM cable cover *(For ESL9326 only)*
0615031	4	Screws 10F x 0.50
6312131	1	Cable clamp, PCI chassis
6433020	1	Cover, bin shelf openings

Multi-unit trim parts

Table 3 lists the required multi-unit trim parts:

Table 3: Multi-unit trim parts

Part number	Quantity	Description
0615079	4	Screws 6C x 0.50
0725101	1	Vinyl foam tape, 0.25" thick, 142" long
0845139	13	Hex nuts 6c x 0.31
ESL9198 and ESL9326		
6312029-01	1	Male cosmetic panel
6312030-01	1	Female cosmetic panel
6312067-01	1	External cosmetic channel
6312068-01	1	Internal cosmetic channel
6312069-01	1	Cosmetic angle
6312069-02	1	Cosmetic angle
ESL9322 and ESL9595		
6312029-04	1	Male cosmetic panel
6312030-04	1	Female cosmetic panel
6312067-04	1	External cosmetic channel
6312068-04	1	Internal cosmetic channel
6312069-07	1	Cosmetic angle
6312069-08	1	Cosmetic angle

PTM required tools

The following tools are required to perform the PTM installation procedure:

- 12-inch straight edge ruler
- #2 Phillips screwdriver
- 5/16-inch open end wrench
- Torque wrench capable of 30-in/lb with #2 Phillips bit, 5/16-inch socket, and 4-inch minimum extension
- Torque wrench capable of 70-in/lb with 7/16-inch socket and 2-inch minimum extension
- Torque wrench capable of 5-in/lb with 5/32-inch socket
- 1/4-inch drive ratchet with 1/4-inch socket
- 12-inch (30 cm) level

Installing a PTM

This chapter describes how to install a PTM for an HP StorageWorks ESL9000 Series tape library. Sections in this chapter include:

Attaching the libraries

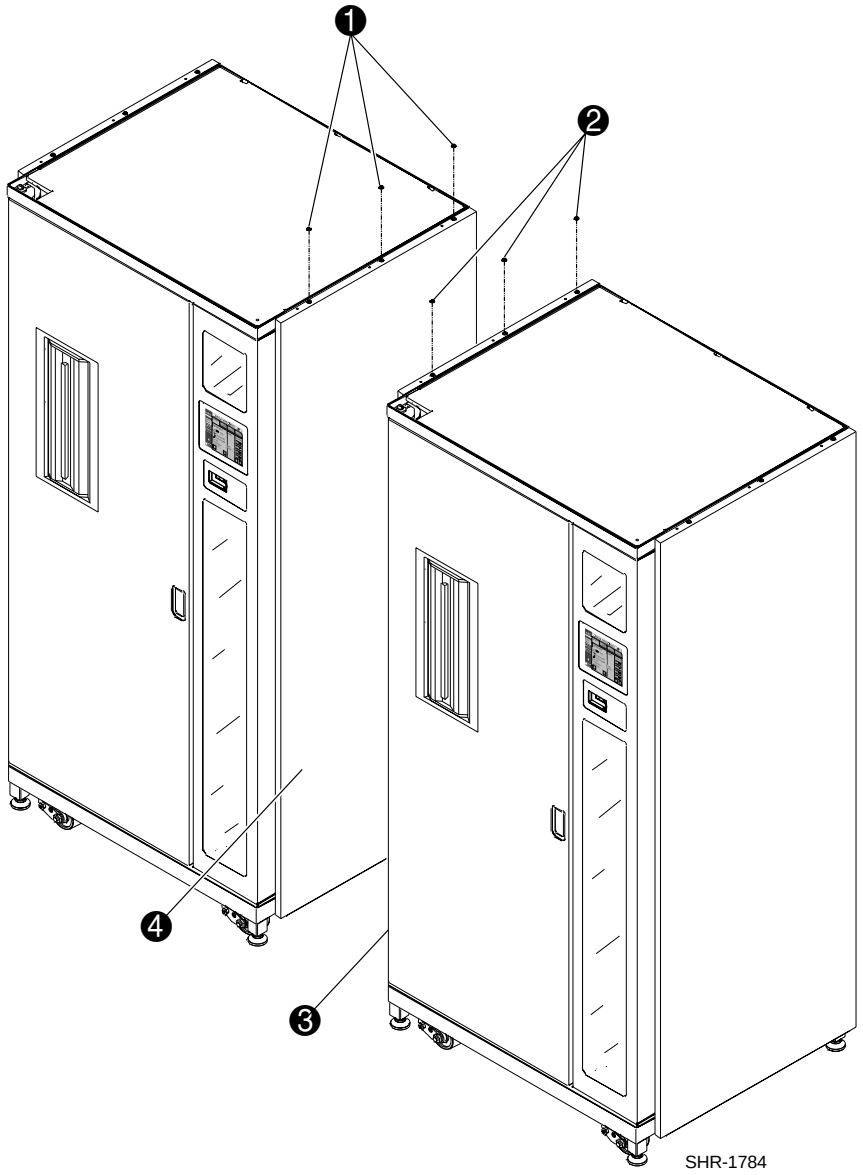
All of the tape libraries must be physically attached to one another. Repeat the following procedure for all libraries in the configuration.

Note: It is recommended that all ESL9000 Series tape libraries in the MUSL set use the same drive types. Check with your application software vendor if you want to mix drive types in the MUSL library.

To attach the first two libraries:

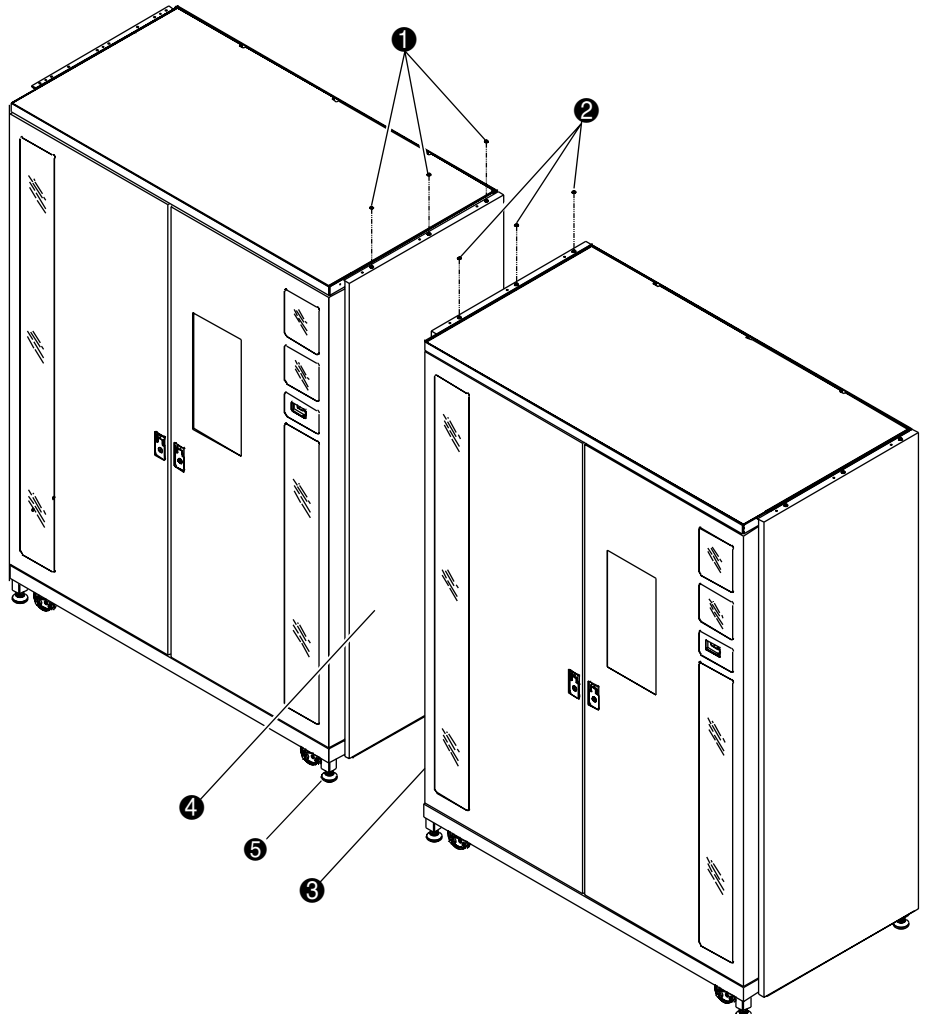
WARNING: Two people are required to perform the procedure. Failure to use two people might cause personal injury and/or equipment damage.

1. Power off and unplug the libraries from their power source.
2. Raise the leveling feet on both the right and left libraries so they rest on the caster wheels.
3. Remove the left side panel ❸ on the right library and right side panel ❹ on the left library. (See Figure 2 on page 19 or Figure 2 on page 20 depending on your model).
   a. Remove the three screws at the top of the panel ❶ or ❷.
   b. Lift the panel upward. Note that a sharp force upward may be required to dislodge the panel from the retainer posts.



❶ Three screws (left library)
❷ Left panel of right library
❸ Three screws (right library)
❹ Right panel of left library

Figure 1: Removing the side panel (single drive column models)



❶ Three screws (left library)
❷ Three screws (right library)
❸ Left panel of right library
❹ Right panel of left library
❺ Leveling foot (4 per library)

Figure 2: Removing the side panel (dual drive column models)

4. Remove the PTM access panels ❶ on the left and right sides of the libraries (see Figure 3).

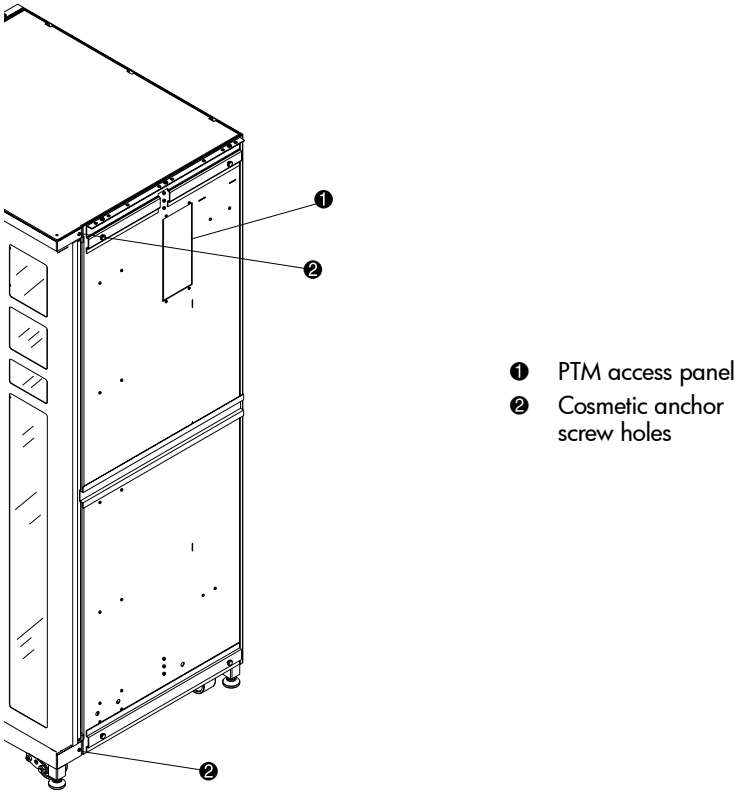
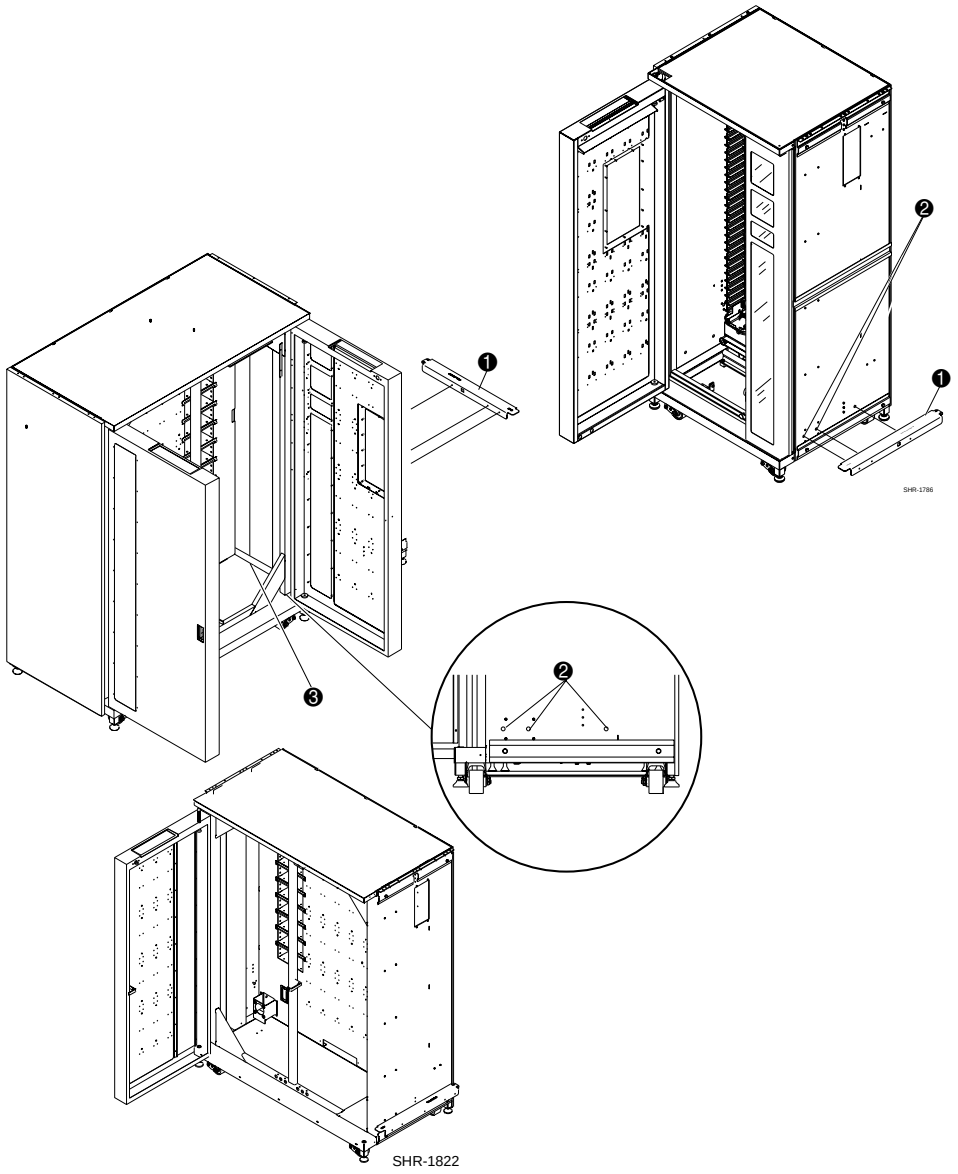


Figure 3: Cosmetic anchor screw hole locations

5. On each library, remove the existing screws (❷ Figure 3) and install four new screws (P/N 0615079) in the two libraries to be connected. Do not tighten, leave one-quarter inch clearance between the SEM washer and the trim pieces.
6. Install the lower cabinet attachment channel on the left library (❶ Figure 4 on page 23) using three bolts (P/N 0615113) and washers (P/N 0685521). Do not fully tighten. Allow the lower cabinet attachment channel to float freely.

Note: On ESL9322 and ESL9595 libraries, install the lower cabinet attachment channel using two bolts (0615113) and washers (0685521) instead of three; the center mounting hole is obstructed by a cable cover.

Caution: Ensure that the ribbon cable is not pinched in the interior of the library when tightening the bolts.



❶ Lower cabinet attachment channel
❷ Lower cabinet mounting holes (right side of tape library)
❸ Inside ribbon cable cover

Figure 4: Installing the lower cabinet attachment channel (left tape library)

7. Slowly move the libraries together until the lower cabinet attachment channel on the left library makes contact with the right library (see Figure 5).

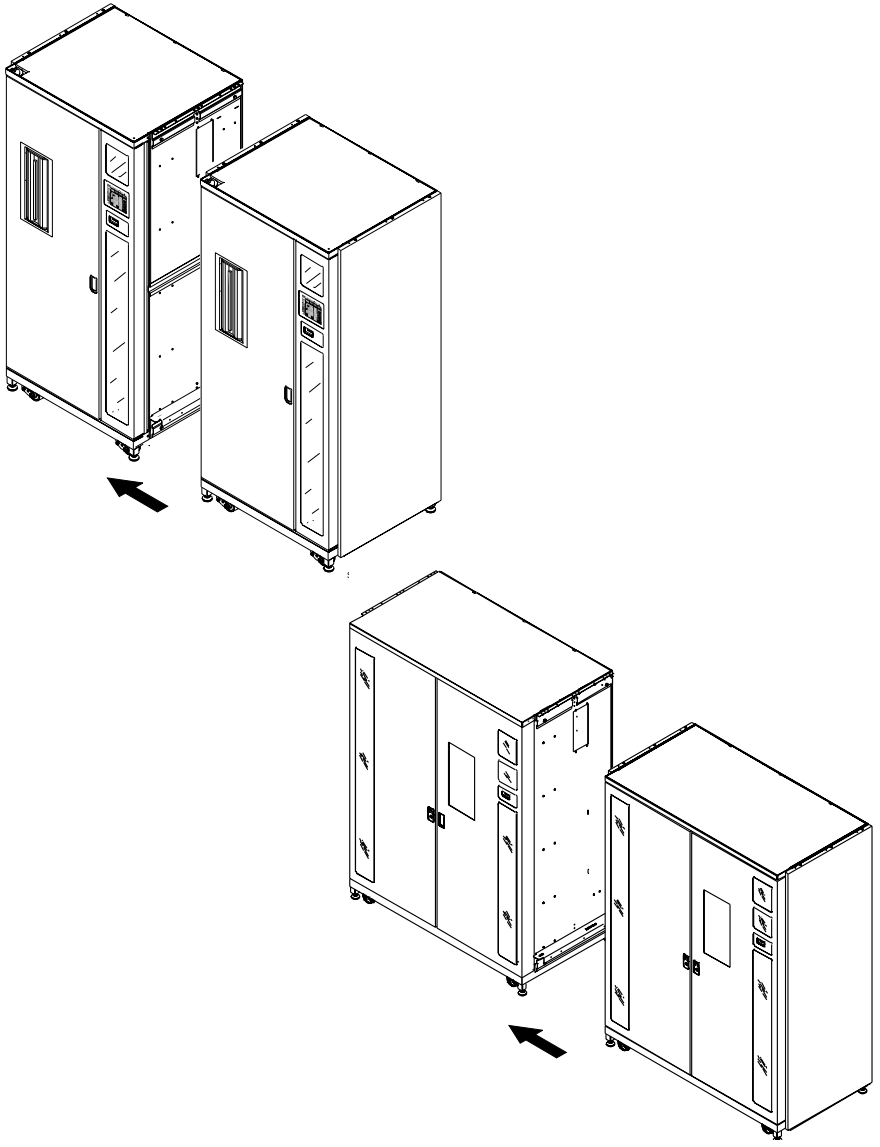
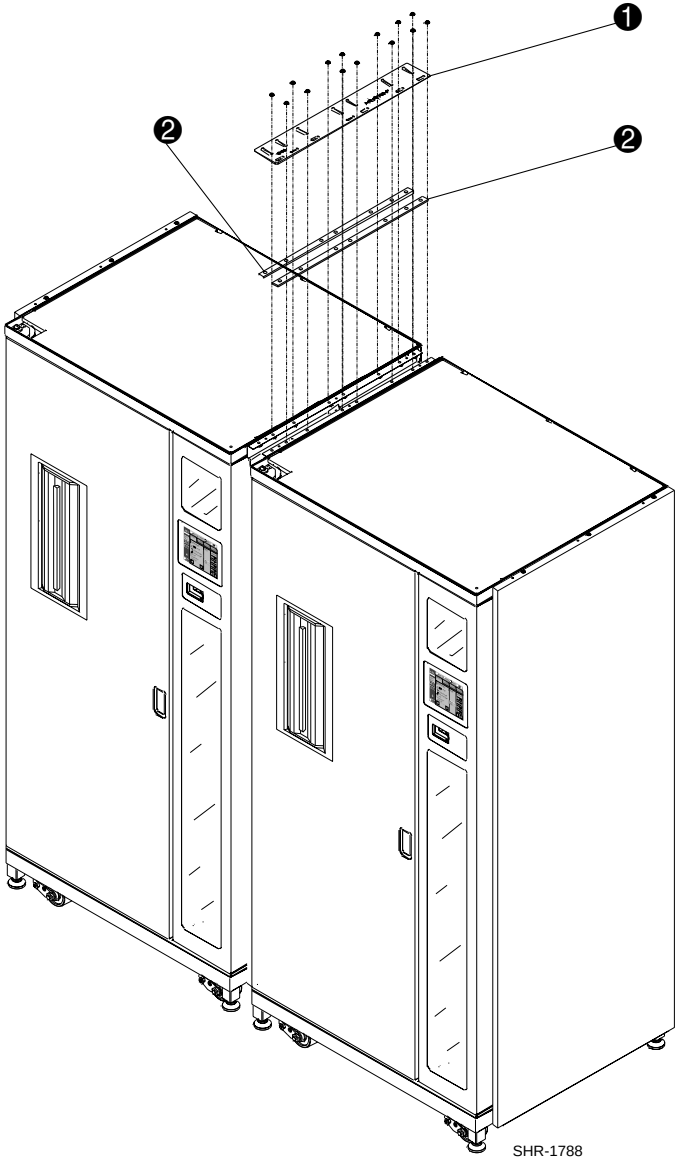


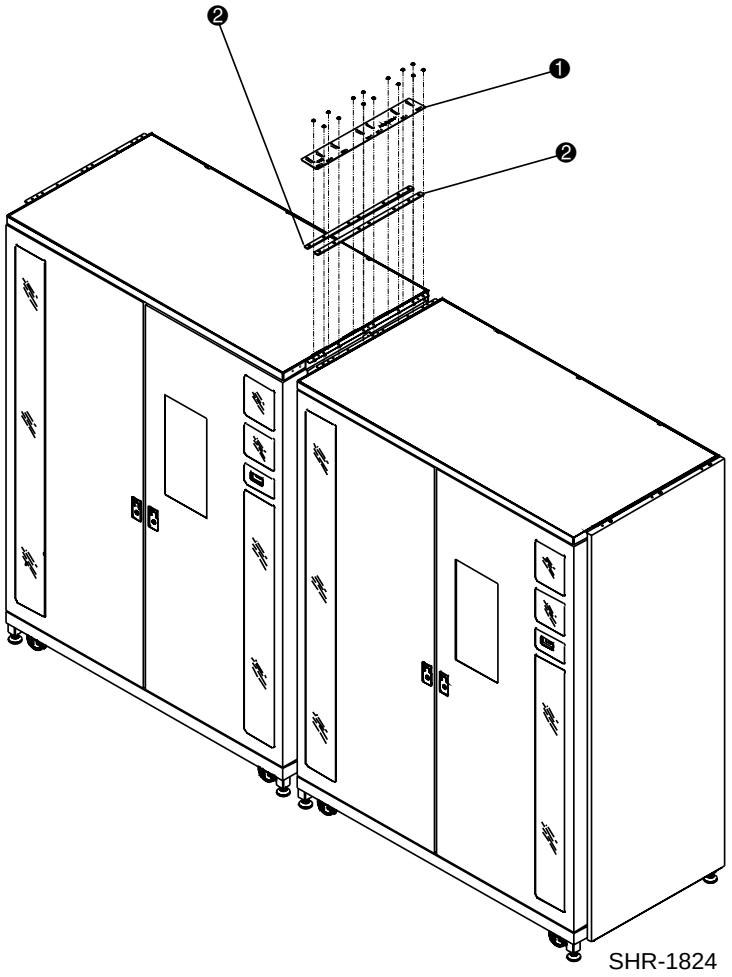
Figure 5: Attaching the library cabinets

8. Attach the right library to the lower cabinet attachment channel with five bolts (P/N 0615113) and washers (P/N 0685521). Do not fully tighten; allow the lower cabinet attachment channel to float freely.
9. Lower the leveling feet on both libraries.
10. Using the 12 inch (30 cm) level, level both libraries appropriately while maintaining the following:
    a. The tape cartridge bin walls should be coplanar within 0.06 inch (1.5 mm).
    b. The front surfaces of the two libraries should be coplanar within 0.25 inches (6.4 mm).
    c. The top surfaces of the two libraries should be coplanar within 0.06 inches (1.5 mm).
11. Tighten the lower cabinet attachment channel screws in both libraries to a torque value of 70 in/lb.
12. Install the two spacers (P/N 6312028) and the upper cabinet attachment plate (P/N 6312027) with seven screws and washers on each library. (See Figure 6 on page 26 or Figure 7 on page 27 depending on your model.)



❶ Upper cabinet attachment plate ❷ Spacers

Figure 6: Upper cabinet attachment plate and spacers (single drive column models)



❶ Upper cabinet attachment plate ❷ Spacers

Figure 7: Upper cabinet attachment plate and spacers (dual drive column models)

Note: The upper cabinet attachment plate might distort when the screws are tightened. This is normal.

Installing the PTM

The installation instructions differ depending on the libraries that are being connected. Refer to the following sections depending on your specific library:

- Installing the PTM in an ESL9198 or ESL9322, page 28
- Installing the PTM in an ESL9326 or ESL9595, page 41

Installing the PTM in an ESL9198 or ESL9322

The PTM installation consists of the following steps:

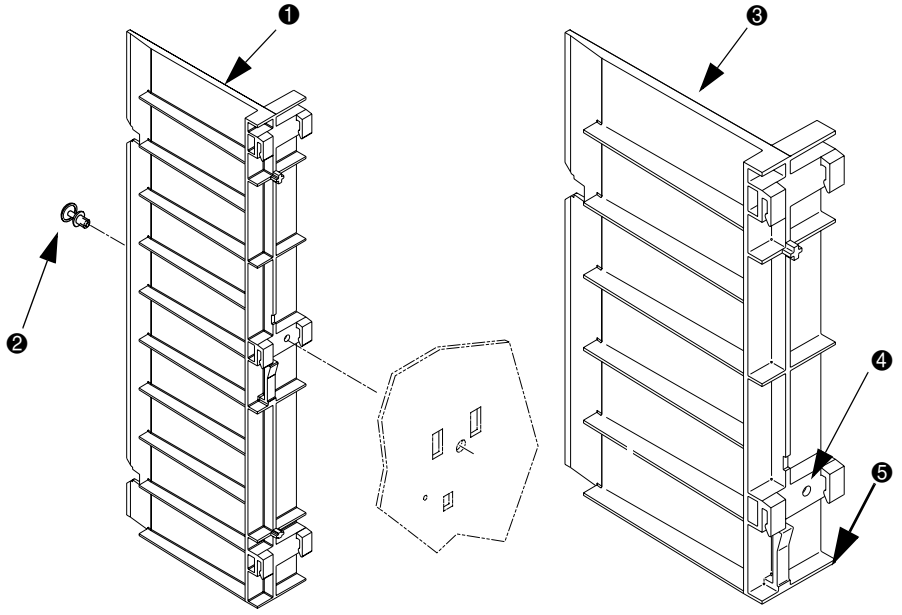
- Removing the tape cartridge bins, page 28
- Installing the PTM adapter plate, page 35
- Installing the PTM assembly, page 37
- Centering the PTM assembly, page 39
- Reinstalling the tape cartridge bins, page 40

Removing the tape cartridge bins

Before installing the PTM, certain tape cartridge bins must be removed from the library. The specific tape cartridge bins to remove differ depending on the position of the library in the multiple-unit configuration. Refer to Table 4 on page 31 for information on which bins to remove.

Note: Right side of the library refers to the right side as you face the front of the library. Left side of the library refers to the left side as you face the front of the library.

To remove the bins (see Figure 8):

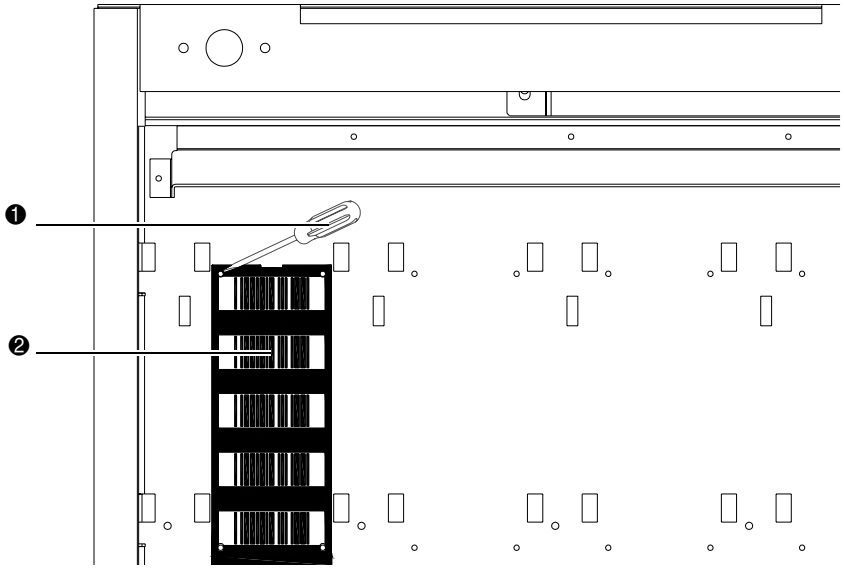


❶ ESL9198 tape cartridge bin
❷ Nylon snap rivet (1 per module)
❸ ESL9322 tape cartridge bin
❹ Snap rivet to be removed
❺ Latch to press while lifting the tape cartridge bin

Figure 8: Removing the tape cartridge bin

1. Use a flat blade screwdriver to pry up the snap rivets securing the tape cartridge bin to the library wall.
2. If the library is an ESL9198, lift up on the tape cartridge bin and remove it from the library.
3. If the library is an ESL9322, remove the tape cartridge bin as follows:
   a. Locate the latch at the bottom rear edge of the tape cartridge bin.
   b. Using a flat blade screwdriver, press the latch forward (toward the front of the tape cartridge bin).
   c. While pressing the latch, lift up on the tape cartridge bin and remove it from the library.

4. Remove the empty bin label from the library wall using a flat blade screwdriver to pry up the rivets (see Figure 9).



❶ Screwdriver ❷ Safety bin label

Figure 9: Removing empty bin labels

Table 4: ESL9198 and ESL9322 tape cartridge bin removal

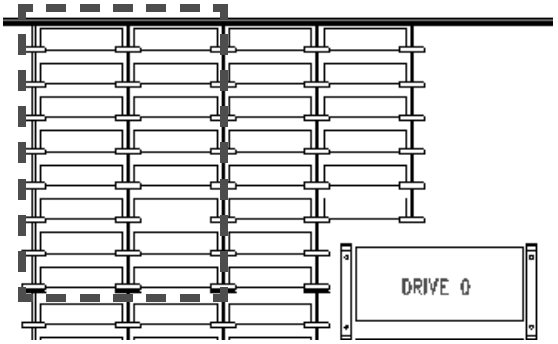
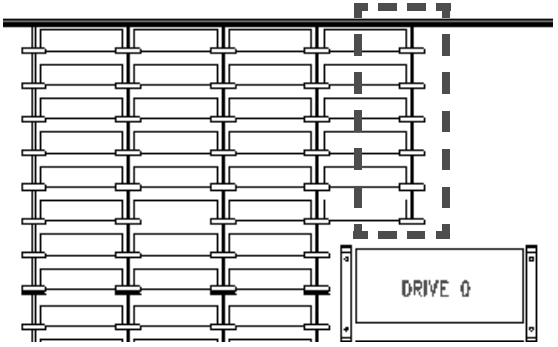
Library orientation	Tape cartridge bins to remove
ESL9198 library with PTM installed on left side of library: ■ Remove the three cartridge bin shelf modules from the interior wall of the library as shown. (Also see Figure 10 on page 33.) ■ When installing the PTM, you may need to temporarily remove two more bins to allow the PTM to be positioned.	
ESL9198 library with PTM installed on right side of library: ■ Remove the single cartridge tape cartridge bin from the interior wall of the library as shown. (Also see Figure 10 on page 33.) ■ When installing the PTM, you may need to temporarily remove two more bins to allow the PTM to be positioned.	

Table 4: ESL9198 and ESL9322 tape cartridge bin removal (Continued)

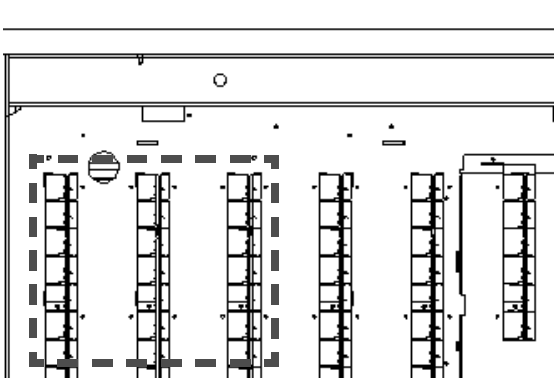
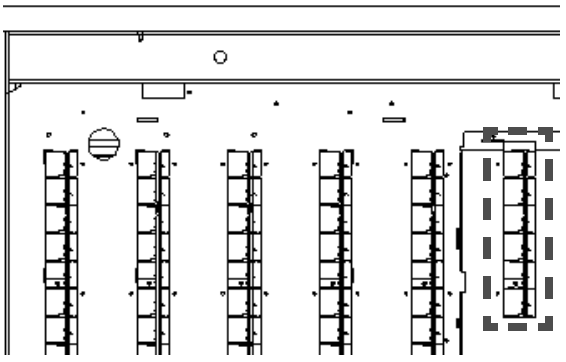
Library orientation	Tape cartridge bins to remove
ESL9322 library with PTM installed on left side of library: ■ Remove the three cartridge bin shelf modules from the interior wall of the library as shown. (Also see Figure 11 on page 34.) ■ When installing the PTM, you may need to temporarily remove two more bins to allow the PTM to be positioned.	
ESL9322 library with PTM installed on right side of library: ■ Remove the single cartridge tape cartridge bin from the interior wall of the library as shown. (Also see Figure 11 on page 34.) ■ When installing the PTM, you may need to temporarily remove two more bins to allow the PTM to be positioned.	

Table 5 shows the slot reduction based on library model and PTM location.

Table 5: Slot reduction (ESL9198 and ESL9322)

Library and PTM location	Slot reduction
ESL9198, PTM on right side of library	6
ESL9198, PTM on left side of library	24
ESL9322, PTM on right side of library	6
ESL9322, PTM on left side of library	30

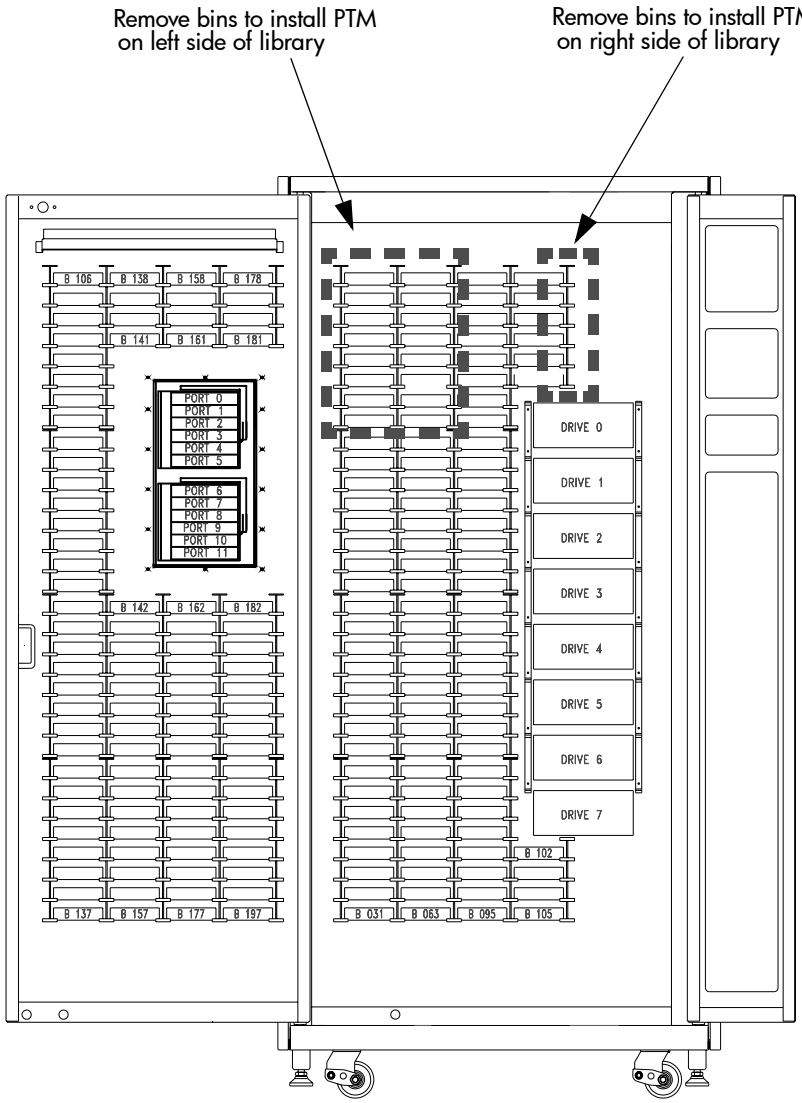


Figure 10: ESL9198 bin removal locations

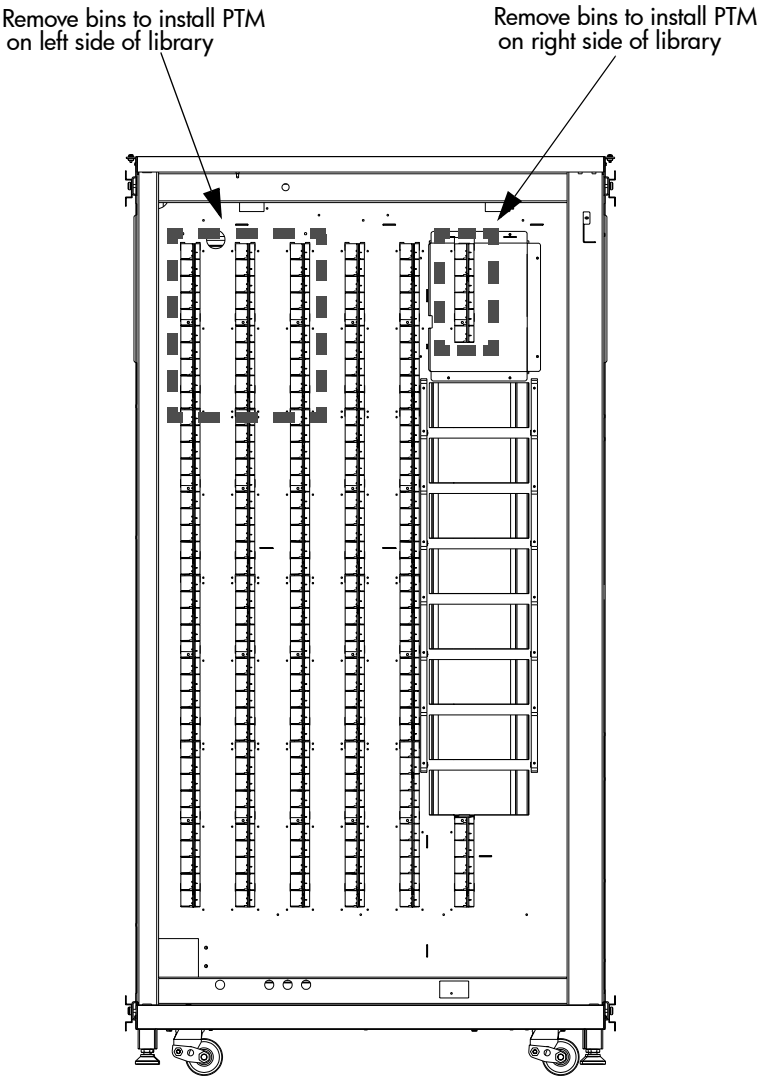


Figure 11: ESL9322 bin removal locations

Installing the PTM adapter plate

To install the PTM adapter plate:

1. Remove the cable hole plug as shown in Figure 12 and install the bushing provided into the hole.

Note: Two sizes of bushing were provided with the upgrade kit: 1.5 in. (0605061) and 2 in. (0605060). Use the bushing that best fits the cable hole.

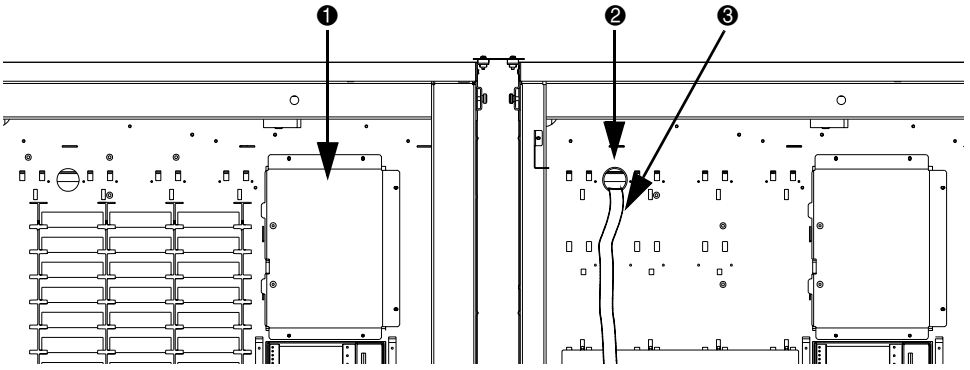


Figure 12: PTM cable routing

2. Reach through the hole (see Figure 12) and pull the pass-through cable through the hole, leaving approximately 18 in. of cable on the front side of the bin wall.
3. Install the PTM adapter plate, securing it with the six screws provided in the PTM kit (see Figure 12).
4. Attach the pass-through cable cover with three nylon push-in clips and four 10-32 x 5/8 screws and washers to the bin wall to cover the cable and cable hole, ensuring that the PTM cable is routed correctly under the raised channel in the cover (see Figure 13). Tighten screws to 30 ± 3 in lb.
5. Install the bin shelf openings cover using six nylon push-in clips (see Figure 13).

6. Install two 10-32 x 5/8 screws with # 10 washers in the mounting locations shown in Figure 13. Do not fully tighten; leave approximately 1/4 in. of space in between the washer and the bin wall.

Installing the PTM assembly

To install the PTM assembly:

1. Holding the PTM right side up, slide it through the right library pass through cut-out and into the left library (see Figure 15 on page 38).
2. Slide the PTM mounting tabs onto the screws.
3. Install two 10-32 x 5/8 screws with #10 washers on the bottom mounting tabs of the PTM, one in each library (see Figure 13).

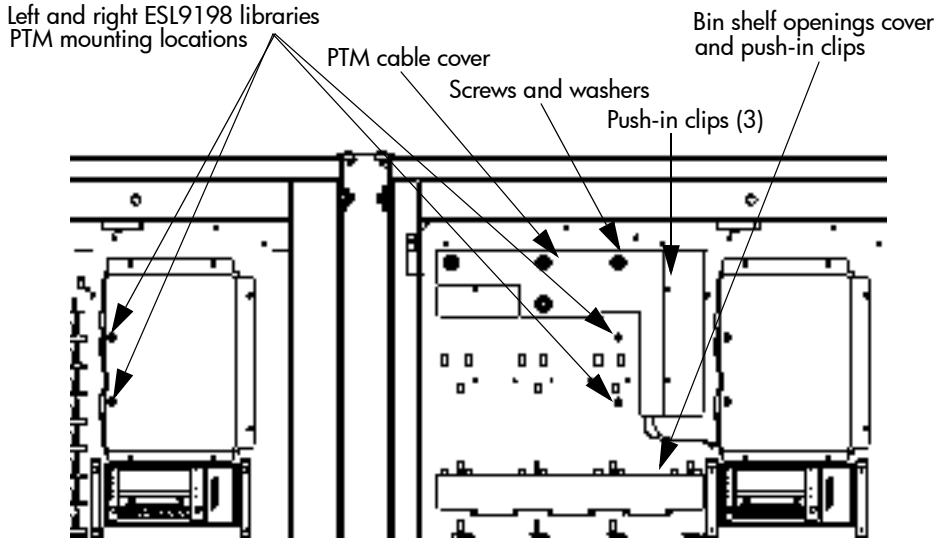


Figure 13: PTM mounting points (ESL9198 shown)

4. Connect the PTM cable to the PTM (see Figure 14).

Note: In Figure 14, the PTM is shown outside of the library for clarify.

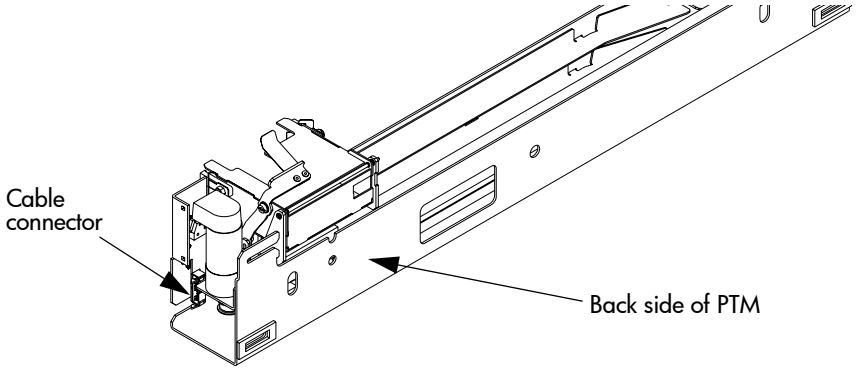


Figure 14: PTM cable connection

5. Route the cable through the clips provided on the bottom of the PTM. Push the excess cable through the cable hole in the bin wall.
6. Attach the pass through cable cover with four 10-32 x 5/8 screws and washers to the bin wall to cover the cable and cable hole (see Figure 15). Tighten screws to 30 ± 3 in lb.

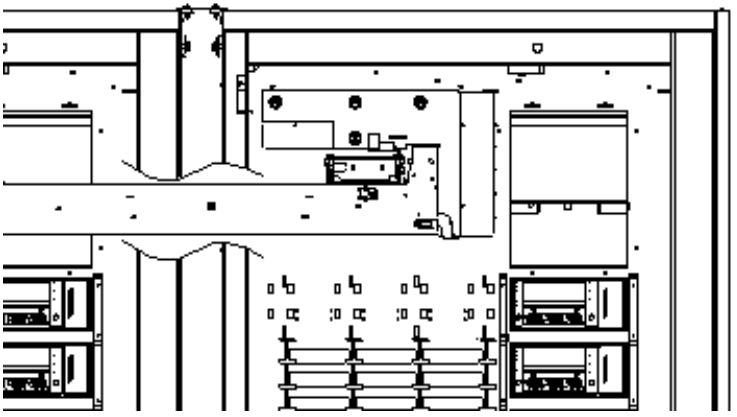


Figure 15: PTM installed

Centering the PTM assembly

After the PTM assembly has been installed in the libraries, it must be centered to operate correctly. For ESL9198 and ESL9322 libraries, center the PTM between the libraries inside the walls as shown in Figure 16. The distance between the inside wall and the PTM in the left library ❶ and the distance between the inside wall and the PTM in the right library ❷ should be 14.06 $\pm$ 0.06 inches in an ESL9198 and 16.60 $\pm$ 0.06 inches in an ESL9322.

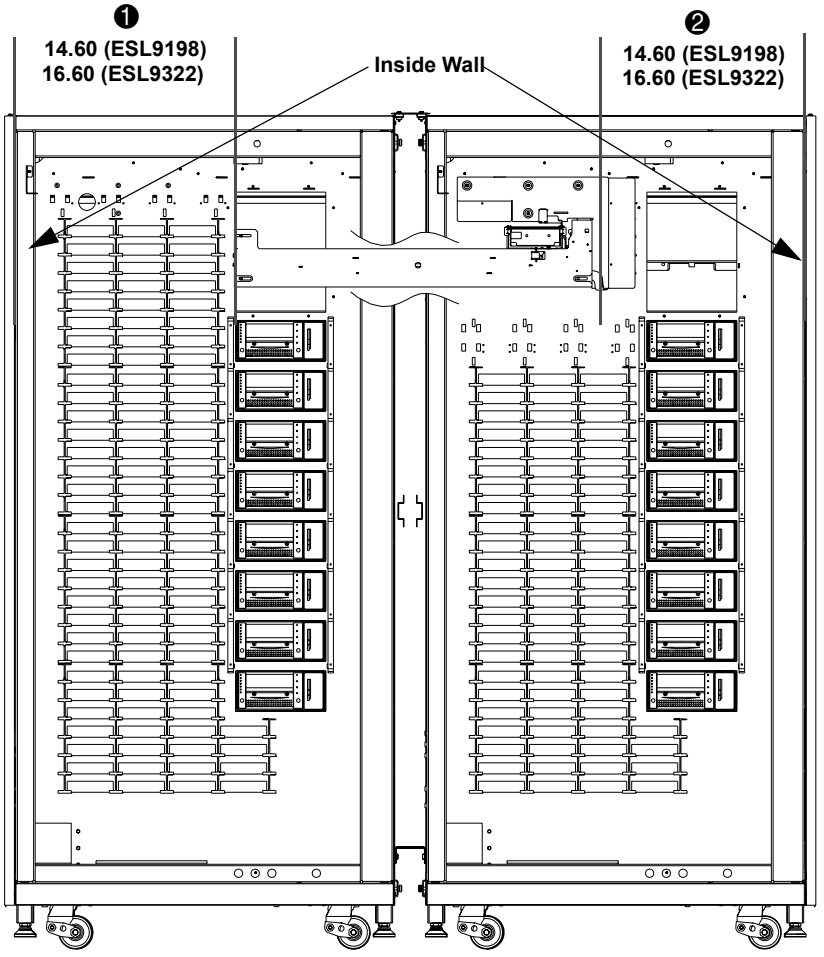


Figure 16: Centering the PTM (ESL9198 shown)

Reinstalling the tape cartridge bins

Once the PTM assembly is centered, tighten the 10-32 screws to 30 +/- 3 in/lb. If necessary, reinstall the tape cartridge bins that were previously removed.

- For PTM assemblies installed on the left side of an ESL9198 library, see Figure 10 on page 33.
- For PTM assemblies installed on the left side of an ESL9322 library, see Figure 11 on page 34.

Note: You do not need to reinstall tape cartridge bins for PTM assemblies that were installed on the right side of ESL9198 and ESL9322 libraries.

Installing the PTM in an ESL9326 or ESL9595

The PTM installation consists of the following steps:

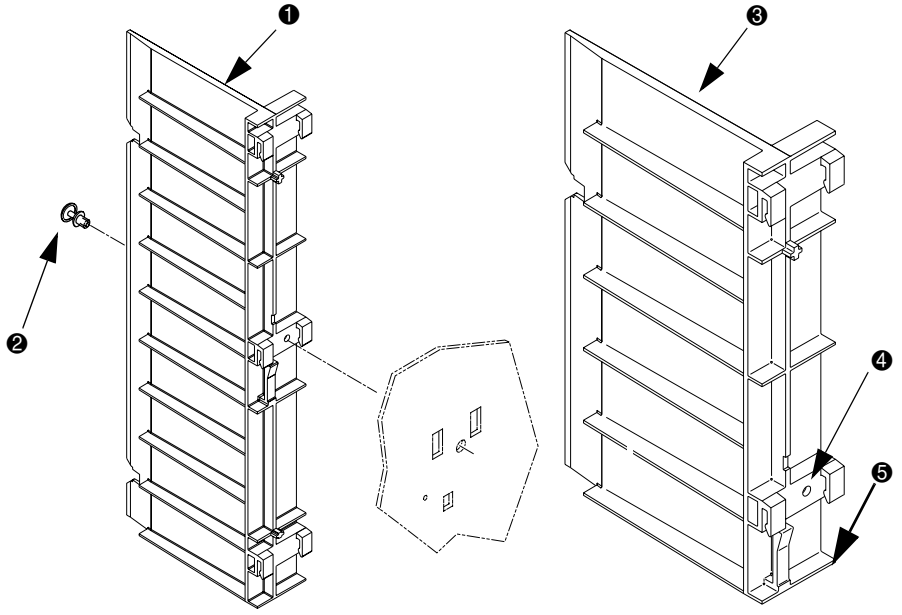
- Removing the tape cartridge bins, page 41
- Installing the PTM assembly, page 49
- Installing the PTM cable cover, page 53
- Centering the PTM assembly, page 54
- Reinstalling the tape cartridge bins (ESL9326 only), page 56

Removing the tape cartridge bins

Before installing the PTM, certain tape cartridge bins must be removed from the library. The specific tape cartridge bins to remove differ depending on the position of the library in the multiple-unit configuration. Refer to Table 4 on page 31 for information on which bins to remove.

Note: Right side of the library refers to the right side as you face the front of the library. Left side of the library refers to the left side as you face the front of the library.

To remove the bins (see Figure 8):

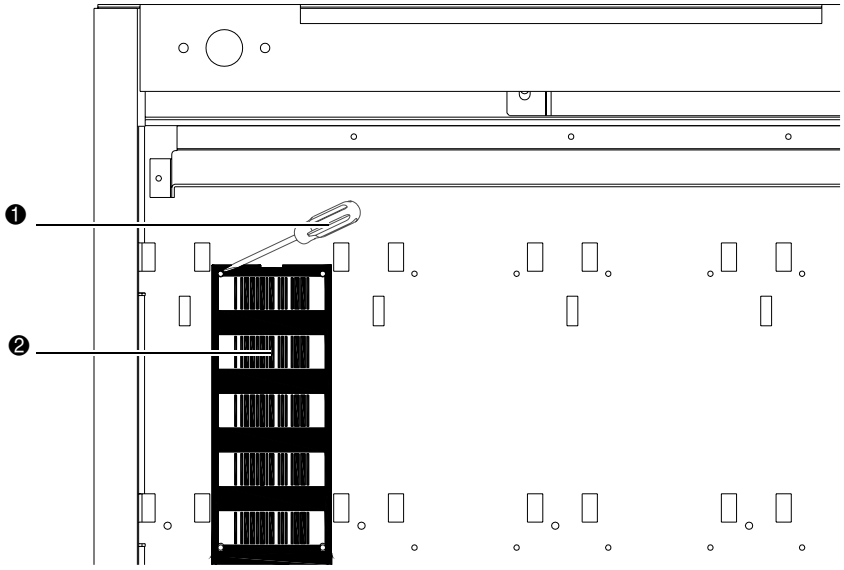


❶ ESL9326 tape cartridge bin
❷ Nylon snap rivet (1 per module)
❸ ESL9595 tape cartridge bin
❹ Snap rivet to be removed
❺ Latch to press while lifting the tape cartridge bin

Figure 17: Removing the tape cartridge bin

1. Use a flat blade screwdriver to pry up the snap rivets securing the tape cartridge bin to the library wall.
2. If the library is an ESL9326, lift up on the tape cartridge bin and remove it from the library.
3. If the library is an ESL9595, remove the tape cartridge bin as follows:
   a. Locate the latch at the bottom rear edge of the tape cartridge bin.
   b. Using a flat blade screwdriver, press the latch forward (toward the front of the tape cartridge bin).
   c. While pressing the latch, lift up on the tape cartridge bin and remove it from the library.

4. Remove the empty bin label from the library wall using a flat blade screwdriver to pry up the rivets (see Figure 9).



❶ Screwdriver ❷ Safety bin label

Figure 18: Removing empty bin labels

Table 6: ESL9326 and ESL9595 tape cartridge bin removal

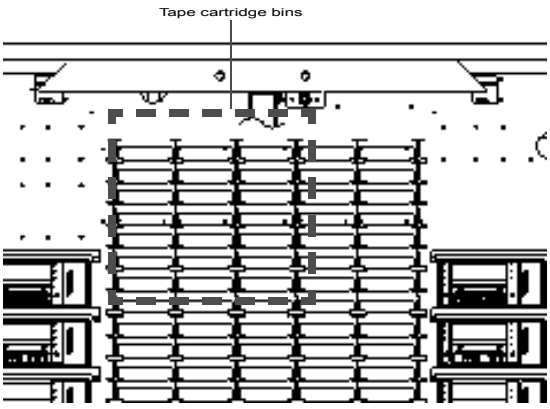
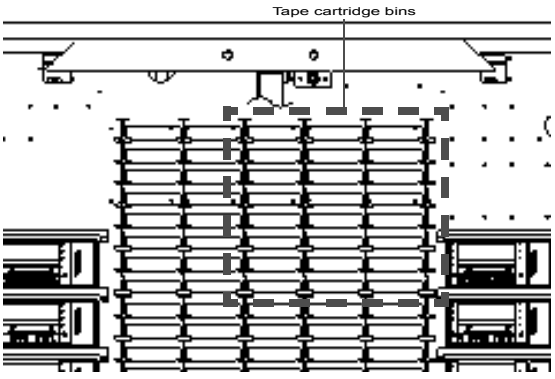
Library orientation	Tape cartridge bins to remove
ESL9326 library in right-most position with PTM installed on left side of another library: ■ Remove the four 8-cartridge bin shelf modules from the interior wall of the library as shown. (Also see Figure 19 on page 47.) **Note:** These bins are reinstalled later in the procedure. ■ When installing the PTM, you may need to temporarily remove two more bins to allow the PTM to be positioned.	
ESL9326 library in the left-most position with PTM connected to another library on the right: ■ Remove the four 8-cartridge tape cartridge bin from the interior wall of the library as shown. (Also see Figure 19 on page 47.) **Note:** These bins are reinstalled later in the procedure.	

Table 6: ESL9326 and ESL9595 tape cartridge bin removal (Continued)

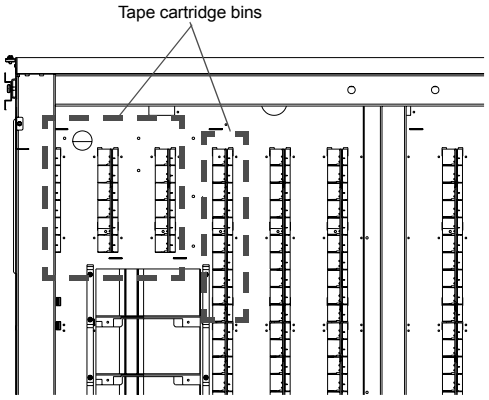
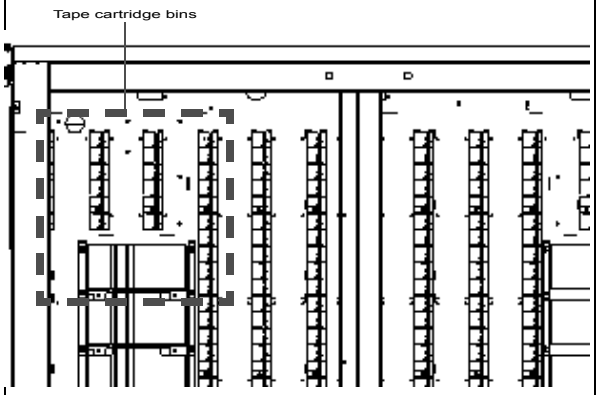
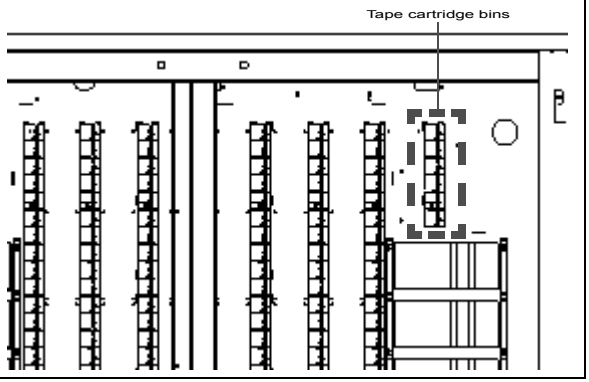
Library orientation	Tape cartridge bins to remove
ESL9595 (400/500/595 bin) library in right-most position with PTM installed on left side of another library: ■ Remove the four bin shelf modules from the interior wall of the library as shown. (Also see Figure 19 on page 47.) ■ When installing the PTM, you may need to temporarily remove two more bins to allow the PTM to be positioned.	
ESL9595 (400/500/595 bin) library in the right-most position with PTM installed on another library on the left: ■ Remove the four 10-cartridge bin shelf modules from the interior wall of the library as shown. (Also see Figure 20 on page 48.)	
ESL9595 (400/500/595 bin) library in the left-most position with PTM connected to another library on the right: ■ Remove the single 6-cartridge tape cartridge bin from the interior wall of the library as shown. (Also see Figure 20 on page 48.)	

Table 7 shows the slot reduction based on library model and PTM location.

Table 7: Slot reduction (ESL9326 and ESL9595)

Library and PTM location	Slot reduction
ESL9326, PTM on right side of library	0
ESL9326, PTM on left side of library	0
ESL9595, PTM on right side of library	6
ESL9595, PTM on left side of library	18

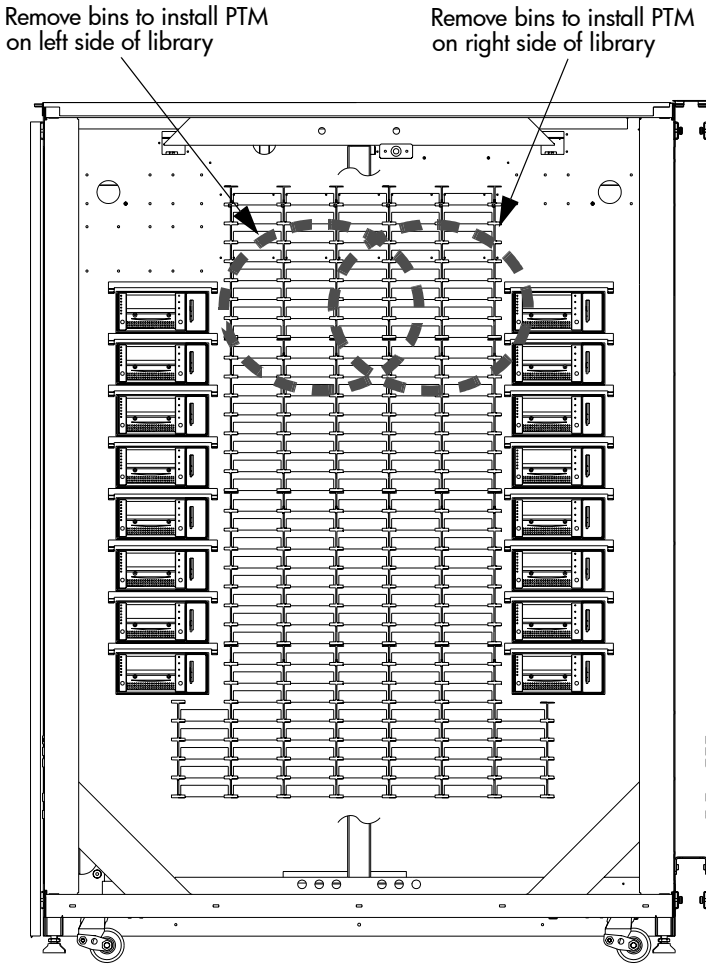


Figure 19: ESL9326 bin removal locations

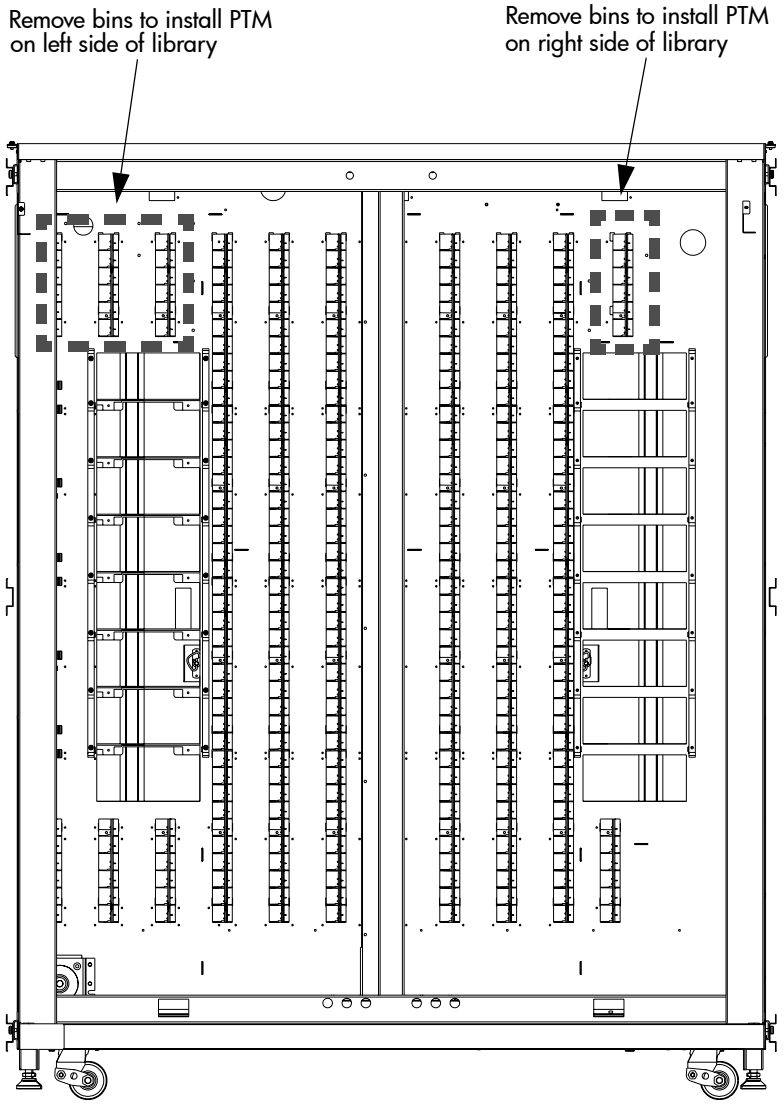


Figure 20: ESL9595 bin removal locations (400, 500 and 595 slot models)

Installing the PTM assembly

To install the PTM assembly:

1. Remove the cable hole plug as shown in Figure 21 and install the grommet provided into the hole.

Note: Two sizes of grommets were provided with the upgrade kit: 1.5 inch (0605061) and 2 inch (0605060). Use the grommet that best fits the cable hole.

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2. Reach through the hole (see Figure 21) and pull the pass through cable through the hole, leaving approximately 18 in. of the cable on the front side of the bin wall.

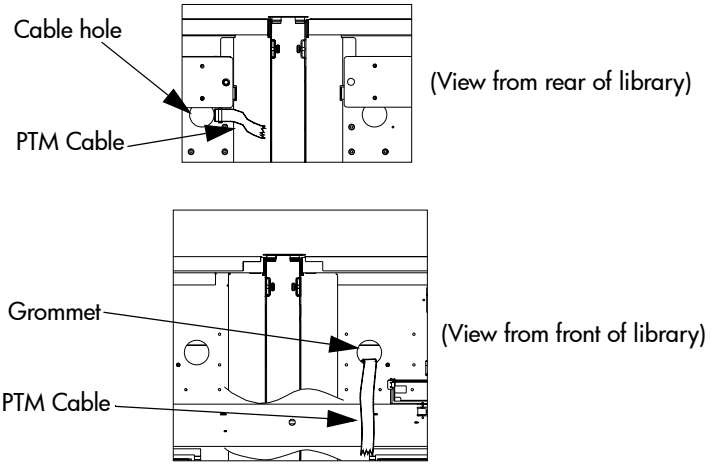


Figure 21: Cable hole location (ESL9326 shown)

3. Install two 10-32 x 5/8 screws with #10 washers in the locations shown in Figure 13 on page 37 and Figure 22. Do not fully tighten; leave approximately 1/4 inch of space in between the washer and the bin wall.

Note: In ESL9326 libraries, the two lower mounting points are not available. Install screws and washers in the upper two holes only, and mount the PTM on these screws and washers.

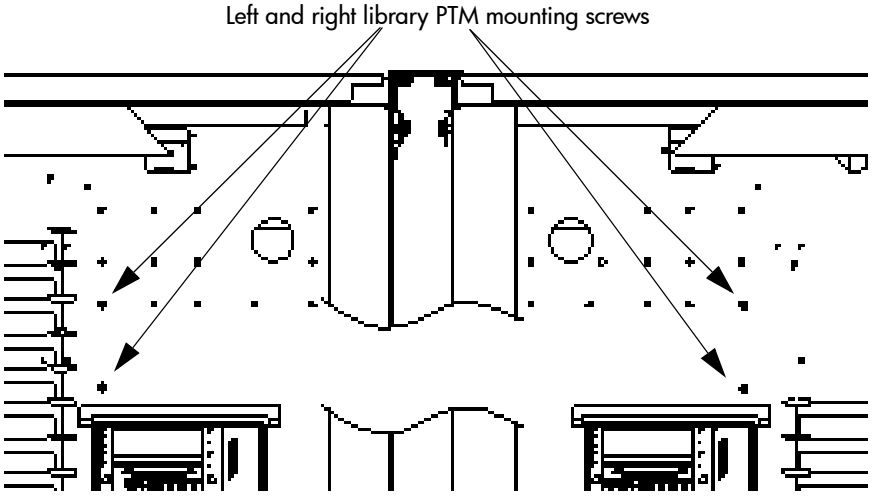


Figure 22: Mounting points (ESL9326 shown)

4. Holding the PTM right side up, slide it through the right library pass through cut-out and into the left library (see Figure 23).

Note: Make sure that the PTM cable is routed behind the PTM assembly.

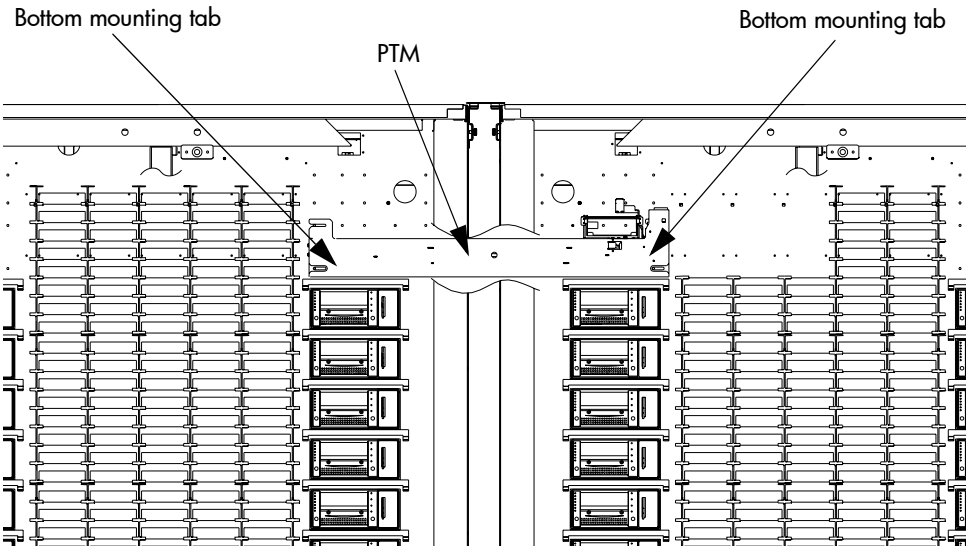


Figure 23: PTM installation (ESL9326 shown)

5. Slide the PTM mounting tabs onto the screws previously installed in step 3.
6. Install the two 10-32 x 5/8 screws with #10 washers on the bottom mounting tabs of the PTM, one in each library (see Figure 23).

7. Connect the PTM cable to the PTM (see Figure 24).

Note: In Figure 24, the PTM is shown outside of the library for clarify.

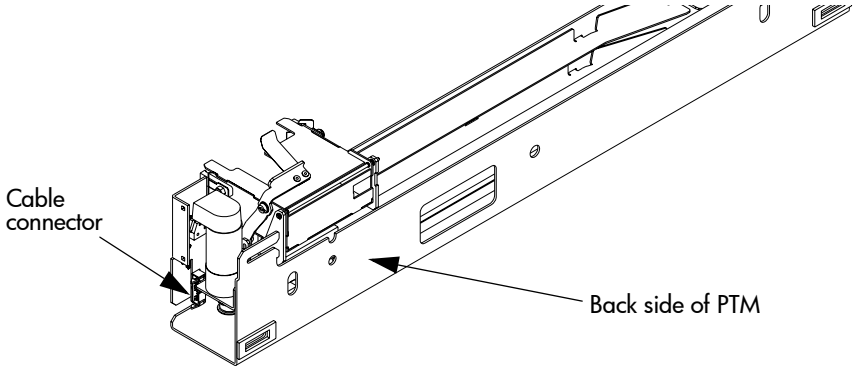


Figure 24: PTM cable connection

8. Route the cable through the clips provided on the bottom of the PTM. Push the excess cable through the cable hole in the bin wall.

Installing the PTM cable cover

To install the PTM cable cover:

1. Attach the pass through cable cover (6312061) with four 10-32 x 5/8 screws and washers to the bin wall to cover the cable and cable hole (see Figure 25). Tighten screws to 30 ± 3 in lb.

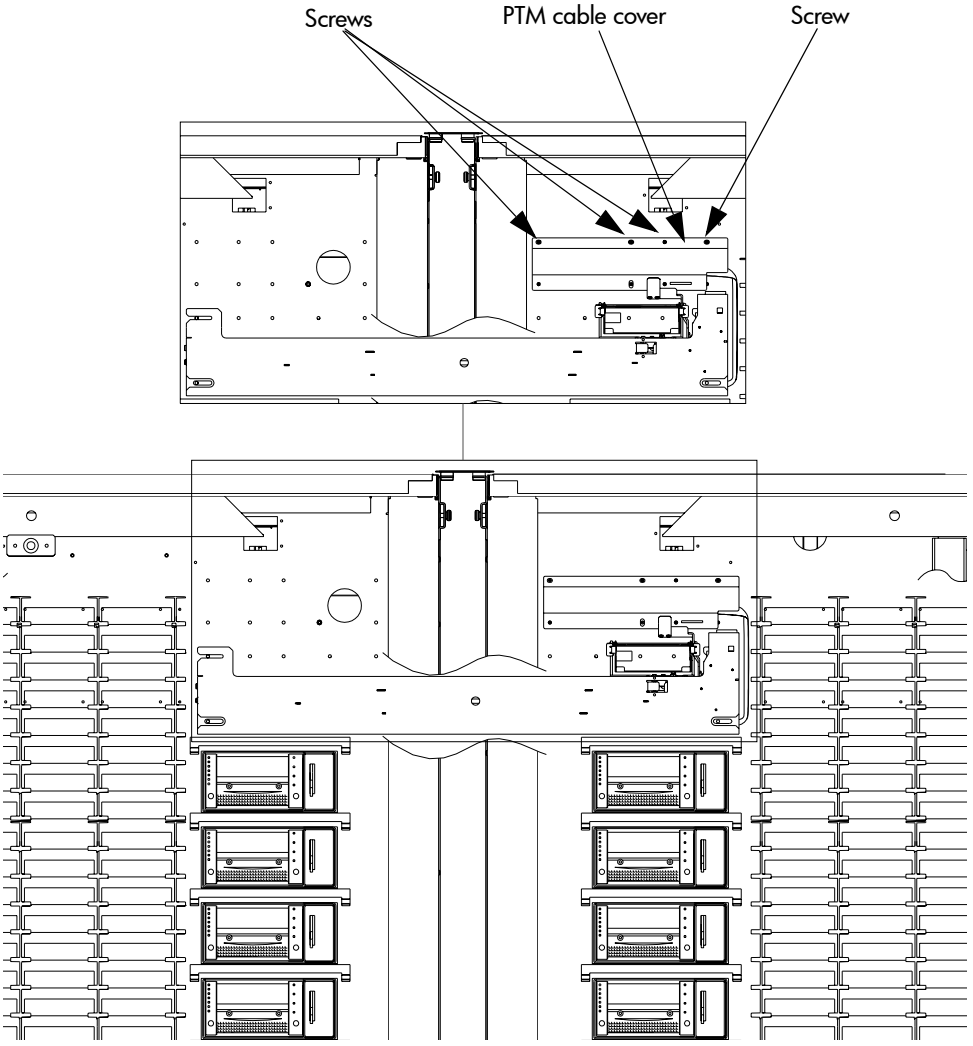


Figure 25: PTM installation (ESL9326 shown)

Centering the PTM assembly

After the PTM assembly has been installed in the libraries, it must be centered to operate correctly. The procedure for centering the PTM differs depending on the library. To center the PTM assembly in an ESL9326 library, see step 1. To center the PTM assembly in an ESL9595 library, see step 2.

1. For the ESL9326, center the PTM between the libraries' bin shelves as shown in Figure 26. The distance between the bin shelves and the PTM in the left library ❶ and the distance between the bin shelves and the PTM in the right library ❷ should be equal within 0.06 inches.

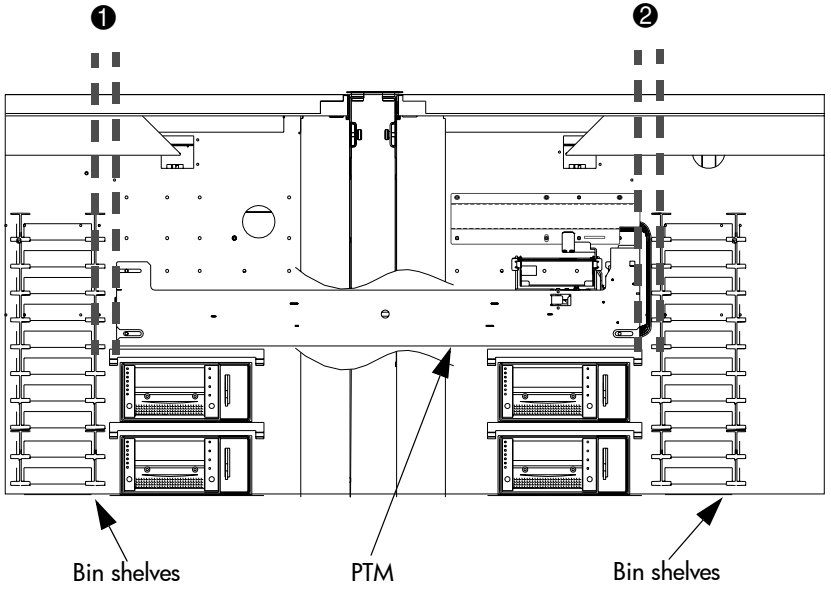


Figure 26: Centering the PTM in an ESL9326 library

2. For the ESL9595 library, center the PTM between the libraries' inside walls as shown in Figure 27. The distance between the inside wall and the PTM in the left library ❶ and the distance between the inside wall and the PTM in the right library ❷ should be 24.85 $\pm$ 0.06 inches.

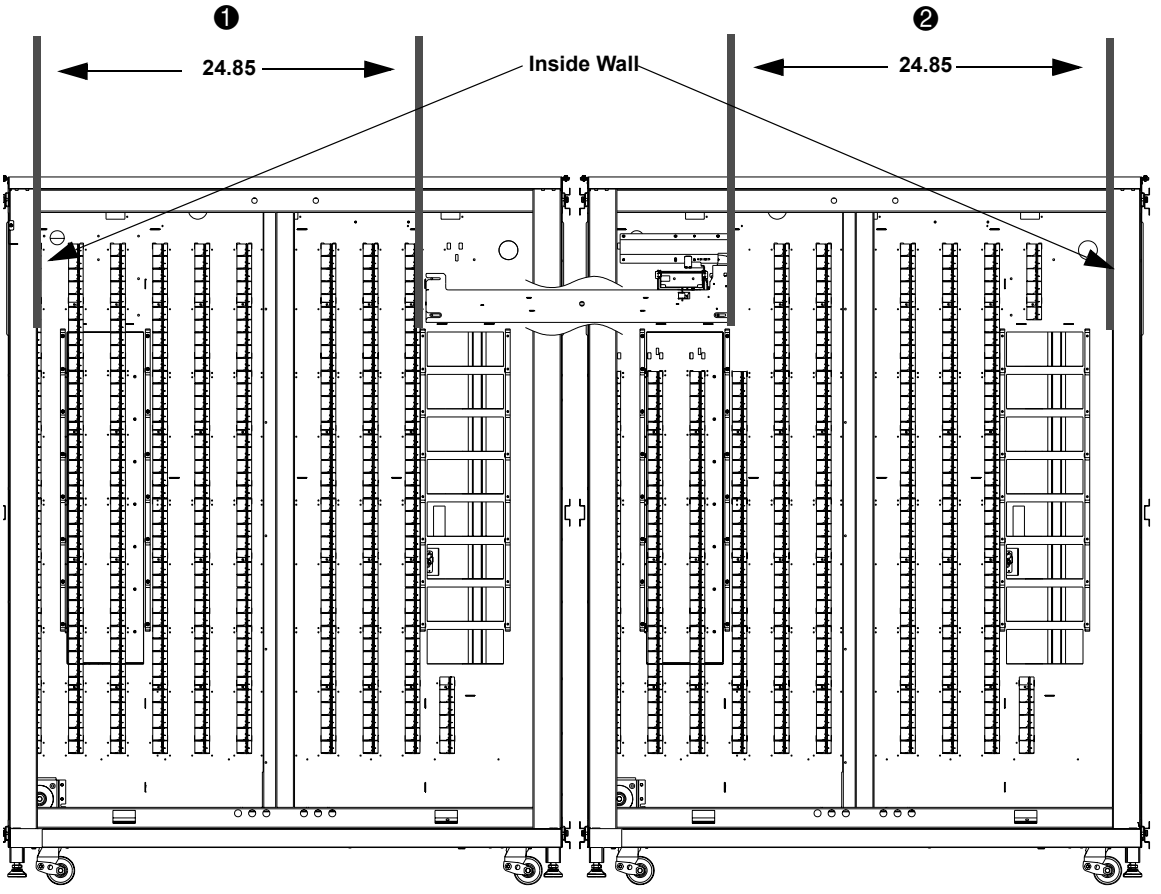


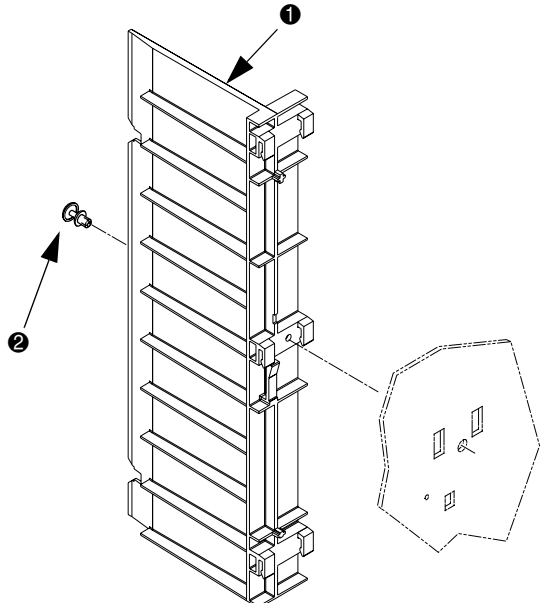
Figure 27: Centering the PTM in an ESL9595 library

Reinstalling the tape cartridge bins (ESL9326 only)

Once the PTM assembly is installed and centered, tighten the 10-32 screws to 30 +/- 3 in/lb. If necessary, reinstall the tape cartridge bins that were previously removed. For PTM assemblies installed on either the left or right side of an ESL9326 library, see Figure 19 on page 47.

Note: Do not reinstall tape cartridge bins for PTM assemblies that were installed on ESL9595 libraries.

1. Position an empty bin label on the back wall of the library and secure it with snap rivets.
2. Align the six molded mounting clips on the back of the tape cartridge bin with the grouping of six vertically paired holes on the back wall of the library (see Figure 28).



❶ ESL9326 tape cartridge bin ❷ Nylon snap rivet (1 per module)

Figure 28: Reinstalling the bin shelf modules

3. Slide the mounting clips into the holes and push down to secure the tape cartridge bin.
4. Place a nylon snap rivet into the hole near the middle of the tape cartridge bin so that it also goes through the matching hole in the back wall of the library, ensuring that the center plunger of the rivet remains extended.
5. Lock the snap rivet in place by pushing the center plunger of the snap rivet in until it contacts the surface of the tape cartridge bin.
6. Repeat these steps to install the remaining bin shelf modules.

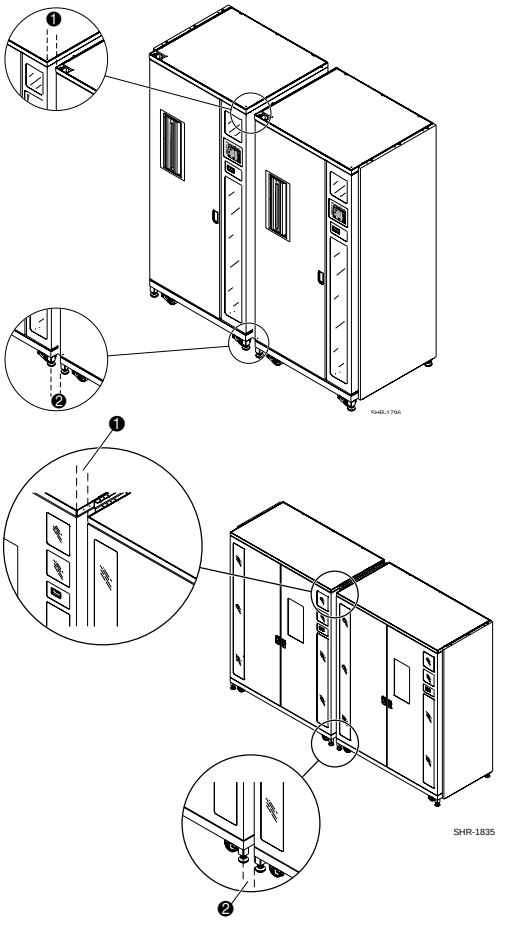
Installing library cosmetics

Cosmetic panels are installed to fill the gaps between the two libraries at the front and at the rear.

Installing the front cosmetic panels

To install the front cosmetic panels:

1. Measure the distance between the libraries at the top ❶ and bottom ❷ of the cabinets (see Figure 29).



❶ Top measurement
❷ Bottom measurement

Figure 29: Space between libraries

2. Loosely assemble the four front cosmetic panels as shown in Figure 30. Do not tighten the nuts at this time.

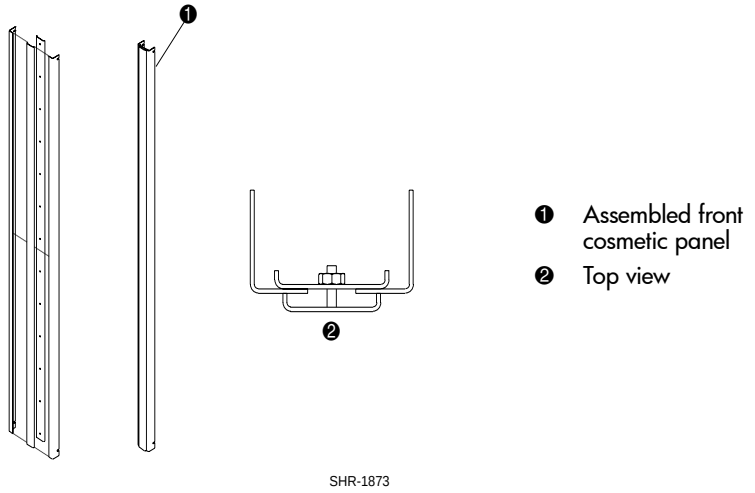


Figure 30: Assembling the front cosmetic panel

3. On the left and right side of the front cosmetic assembly, install two 67.5 inch (171 cm) pieces of foam gasket material as shown in Figure 31.

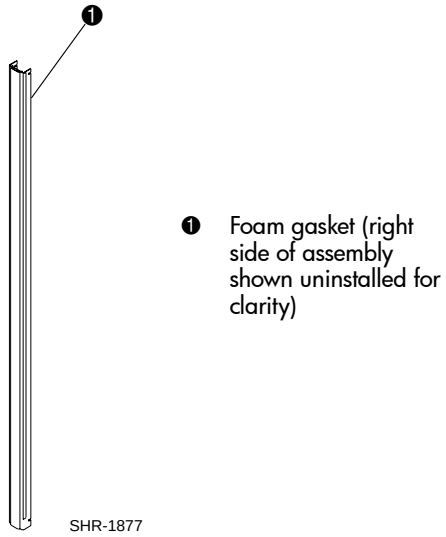
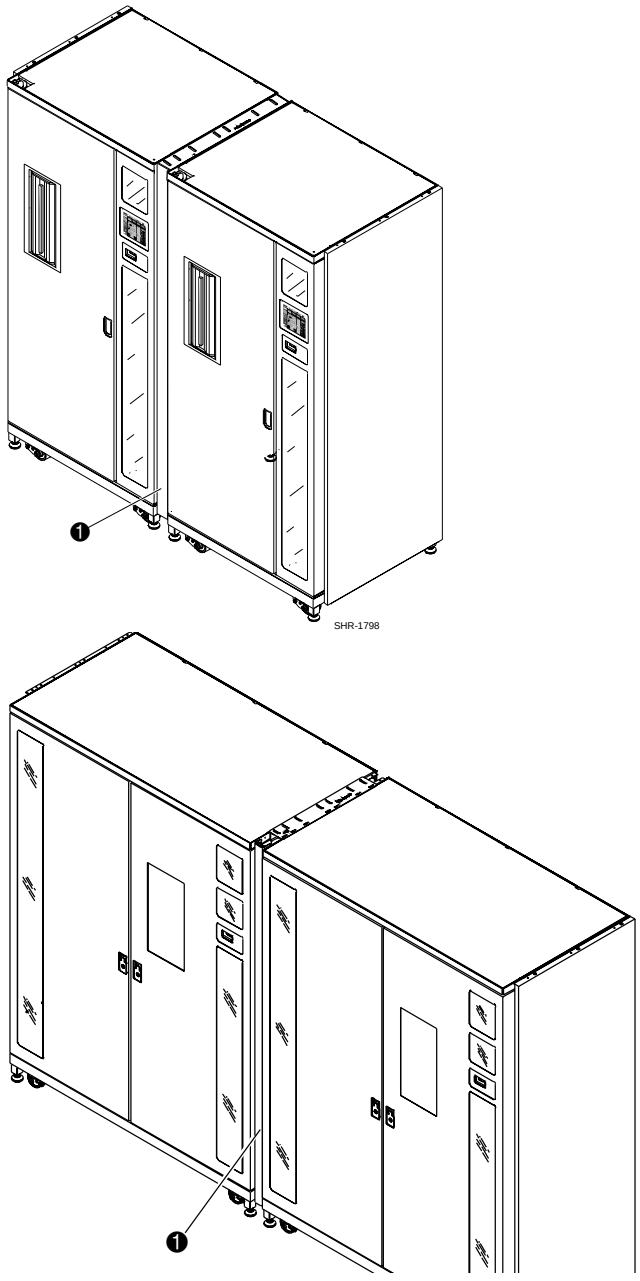


Figure 31: Installing the foam gasket

4. Adjust the width of the top of the assembly to be 1/16 of an inch less than the top measurement found in step 1. This enables the cosmetic assembly to slide in between the libraries for installation.
5. Tighten the nut closest to the top of the assembly to a torque value of 5 in/lb. (.565 Nm)
6. Adjust the width of the bottom of the assembly to be 1/16 of an inch less than the bottom measurement found in step 1.
7. Tighten the nut closest to the bottom of the assembly to a torque value of 5-in/lb. (.565 Nm)
8. Tighten the remaining nuts on the assembly to a torque value of 5-in/lb. (.565 Nm)
9. Install the cosmetic panel assembly into the front gap between the libraries (❶ Figure 32 on page 61). Ensure sure that the open slots in the cosmetic angles engage all four screws (❷ Figure 3 on page 21).



❶ Front cosmetic panel installed

Figure 32: Installing the front cosmetic panel

10. Tighten the four screws.

The front cosmetic panel installation is complete. Repeat the procedure for additional libraries.

Installing the rear cosmetic panels

To install the rear cosmetic panels:

1. Assemble the male ❷ and female ❸ cosmetic panels as shown in Figure 33.

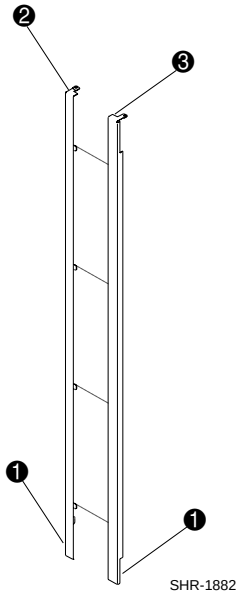
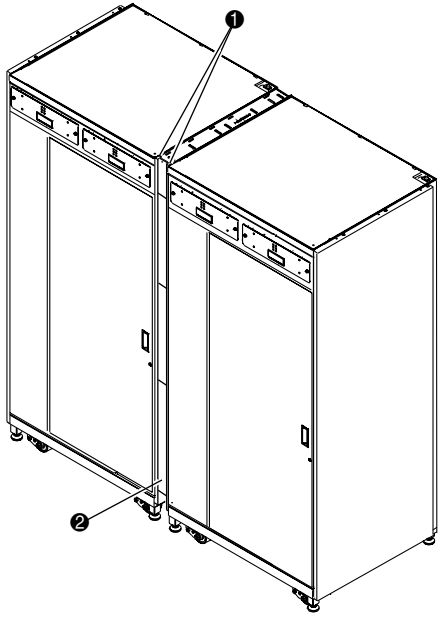


Figure 33: Assembling the rear cosmetic panel

2. Moving the two panels as a unit, install the two lower restraints ❶ into the mating slots in the lower cabinet attachment channel and lower the set of panels until the upper frames of the cosmetic panels rest on each of the two library frames.

3. Install the screws (P/N 0615112) to fasten the rear cosmetic panel to the upper cabinet attachment plate (❶ Figure 34).



❶ Screws (2)
❷ Rear cosmetic panel installed

Figure 34: Installing the rear cosmetic panel

The rear cosmetic panel installation is complete. Repeat the procedure for additional libraries.

Cabling the PTM

This section provides the instructions for connecting a QSPI cable to a multi-unit library system. This section also includes a QSPI bus description.

QSPI bus

The QSPI bus is a full-duplex synchronous serial interface for communicating with peripherals and other micro-controller units. The QSPI bus is a standard Motorola bus that ESL9000 multi-unit library systems use as a custom control language to communicate between master and slave libraries.

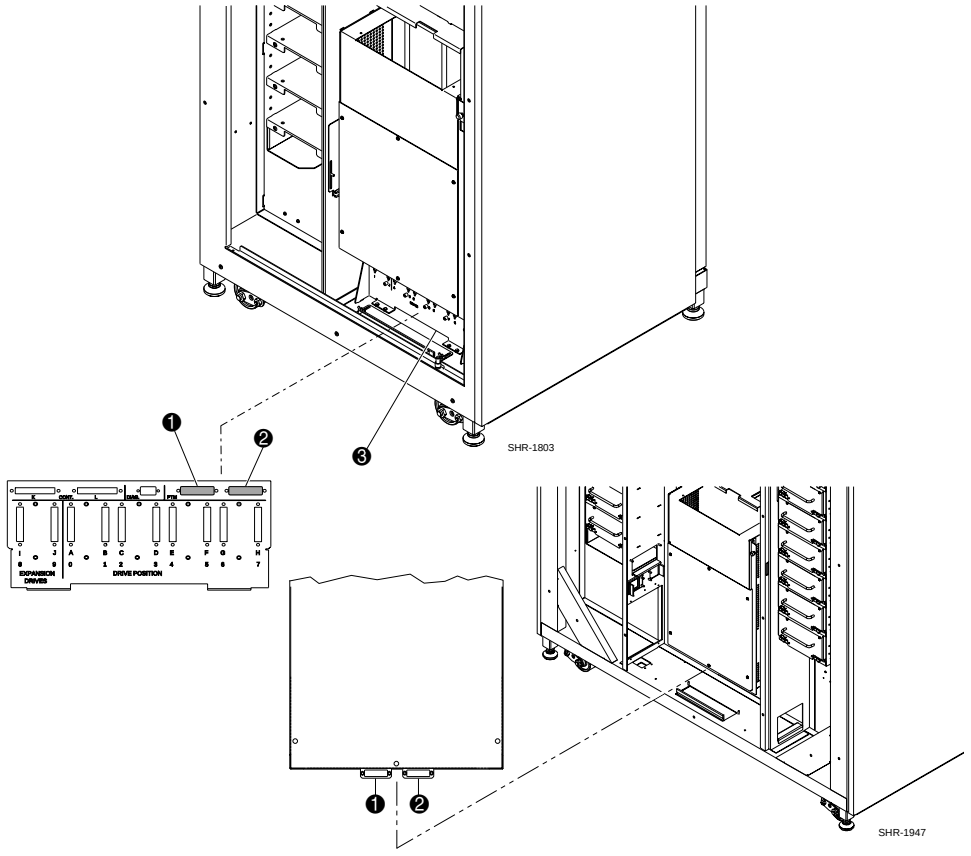
Note: The QSPI bus must be terminated at both ends for proper operation.

Cabling instructions

To cable the libraries:

1. Using a 5/32-inch hex key wrench, open the rear access door of each library being connected.

2. Locate the QSPI connectors at the bottom of the PCI chassis (see Figure 35).



❶ Left QSPI connector
❷ Right QSPI connector
❸ SCSI bulkhead

Figure 35: PTM connector locations

3. Install a QSPI terminator on the left QSPI connector ❶ for the left-most library.
4. Connect one end of the interconnect cable to the right QSPI connector ❷ on the left-most library.
5. Route the interconnect cable through the bottom of the library and then connect it to the left QSPI connector on the right-most library.

6. If there are no other libraries in the configuration, install a terminator in the right QSPI connector of the right-most library. If there are additional libraries in the configuration, continue connecting the libraries using the interconnect cable. Note that the final library in the configuration will have a QSPI terminator on the right QSPI connector.

Configuring and Calibrating a PTM

3

After the PTM has been successfully installed, the libraries must be configured and calibrated to operate correctly as a multi-unit library system.

Caution: If any library is to utilize Multi-Unit (MUSL) functionality, all libraries must be running firmware 3.10 or later. In order to utilize MUSL functionality, all libraries must have the proper backplanes (PN 6310520-04 or newer), proper robotic controller boards (PN 6221710-21 or newer) and QSPI cables.

All libraries running firmware 1.30 or earlier that upgrade to 3.10 or later that will utilize MUSL functionality with another library must reinitialize NV RAM and use the new memory module (PN 6312910-06). To support the new memory module, boot block version 2.01 must be installed. If a library is configured in Single mode, then there is no need to upgrade the boot block or memory module, but the NV RAM must still be reinitialized.

Ensure you understand the capabilities of your application software before enabling autoclean. If the tape drive autoclean feature is to be supported, be sure that at least one cleaning tape exists in each library that will support autocleaning.

Installing firmware

To download firmware using L&TT, the libraries must be running application firmware level 3.40 or later and Boot Block 2.20 or later.

Using HP StorageWorks Library and Tape Tools (L&TT)

Note: Downloading firmware using *L&TT* takes approximately 2 minutes per library. Using the serial download method in the next section takes approximately 45 minutes per library. Using *L&TT* will result in a substantial time savings.

HP now offers *HP StorageWorks Library and Tape Tools (L&TT)* as our premier tape storage device diagnostic tool. *L&TT* is a diagnostic tool that is designed to aid in the installation and maintenance of HP tape storage products. *L&TT* includes several features designed for use by both HP storage customers and trained service personnel. The key features include:

- Diagnostic tools for tape and magneto-optical devices designed for simple troubleshooting
- Multiple options for retrieving and updating both the latest firmware and the most current version of *L&TT*

Frequent firmware image updates are released on the Internet. For optimal performance, HP recommends that you update your system periodically with the latest firmware. L&TT is available for download at no cost from the HP website at: http://www.hp.com/support/tapetools.

Using a serial download

1. Copy the firmware image (zip file) to your portable PC in the Tapelib directory.
2. Unzip the firmware image.
3. Connect your portable PC to the diagnostic connector at the rear of the tape library.
4. Make sure that the tape library is in the Offline state.

Note: You must use native MS-DOS when using the flash download function. Refer to the *Compaq StorageWorks ESL9000 Series Tape Library Diagnostic Software Guide* for more information.

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5. Start the diagnostics by entering TAPELIB/b9600. After a few seconds, the diagnostic screen appears.
6. To verify that the diagnostic software is communicating properly with the tape library, select the Config tab, the Report System, then press the **Enter** key. If the communication is working properly, the current tape library configuration will be reported. If it is not, check the RS-422 cable connections and make sure the tape library is in the Offline state.
7. If the current firmware level is 1.22 or less, go to step 8. Otherwise, make sure that the library is set to either Slave or Single Unit. If the tape library is set to Master, flash download problems may occur. To check this, select the Config tab and then:
   a. Select Multiple Unit
   b. Select Report
   c. If the tape library is set to Master, press the **Escape** key to go back, reselect Multiple Unit, and select Slave. Press the **Enter** key.
8. Before downloading the multi-unit firmware you must reinitialize NVRAM. To do this, select the Config tab and then:
   a. Select Initialization
   b. Select Init Non-Vol Ram and press the **Enter** key.
   c. An informational screen appears and prompts you to continue. Enter Y and press the **Enter** key.

9. Press the **Escape** key to get out of the Initialization function and then:
   a. Select Flash Download and press the **Enter** key.
   b. Select the firmware image that was supplied with the upgrade kit and press the **Enter** key.
   c. A warning screen appears prompting you to continue. Enter Y and press the **Enter** key. The flash download operation takes from 45 to 60 minutes to complete.
10. After the flash download completes, the control panel might display an ATL model number if the memory module has been replaced. This is due to a firmware issue whereby the HP model number is not retained. The HP model number must be entered using the Tapelib diagnostic software.

Resetting the model number

To set the model to (6310080) HP ESL9000 Series, do the following:

1. Press the **Standby** button on the control panel to place the tape library in the Offline state.
2. Reinitialize the NVRAM as follows:
   a. Select Initialization
   b. Select Init Non-vol Ram and press the **Enter** key.
   c. An informational screen appears and prompts you to continue. Enter Y and press the **Enter** key.
3. Press the **Escape** key, select Configure System, and press the **Enter** key.
   a. Select the model number 6310XXX, enter 6310080, and press the **Enter** key.
   b. Select the number of bins and press the **Enter** key.
   c. Select the number of drives and press the **Enter** key.
   d. Select the SCSI ID (0) and press the **Enter** key.
4. Verify the new configuration by selecting Report System. Check that the values displayed are what you entered. If it is ok, press the **Escape** key to exit Tapelib.
5. Verify that the control panel is now displaying the HP StorageWorks ESL9000 model number.

6. Repeat this procedure for all tape libraries that make up the multi-unit tape library system.

Configuring a PTM using the control panel

To configure a PTM from the control panel:

Caution: This procedure must be done using the control panel or diagnostic software any time a PTM is added or removed from a multi-unit library system.

1. From the **Operator** tab, select **Configure Library**.
2. Go to the **PTM** field on the screen and set it to **None**, **Left**, **Right**, or **Both**.

Configuring a multi-unit library system using the control panel

To configure libraries in a multi-unit system using the control panel:

1. At the control panel, place each library in the off-line position.
2. Select the **Multi-Unit (MUSL)** tab.
3. Touch the **Configure Multi-Unit** button.

Note: When configuring PTMs in multiple libraries, each PTM must be configured separately.

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4. Enter **Single**, **Master**, or **Slave** in the **Library Unit** field. The library connected to the host is the master library. HP recommends that the master be the first library from the left of the multi-unit system (library 0). The remaining libraries are slaves.

Caution: When configuring multiple libraries in MUSL mode, there can be only one master library.

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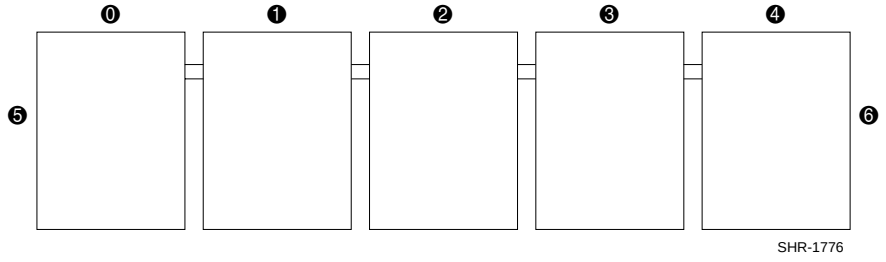
5. Enter a number (0-4) in the **Library Unit #** field (see Figure 36).



❶ Library 0
❷ Library 1
❸ Library 2
❹ Library 3
❺ Library 4
❻ Left-hand side
❼ Right-hand side

Figure 36: Library numbering (front view from control panel)

6. Enter a number (1-5) in the **# of Libraries** field for the number of libraries in the multi-unit library system (see Figure 36 on page 73).
7. Enter **Single LUN** in the **LUN Config** field
8. Repeat step 2 through step 7 for all libraries in the system.

Calibrating the PTM using the control panel

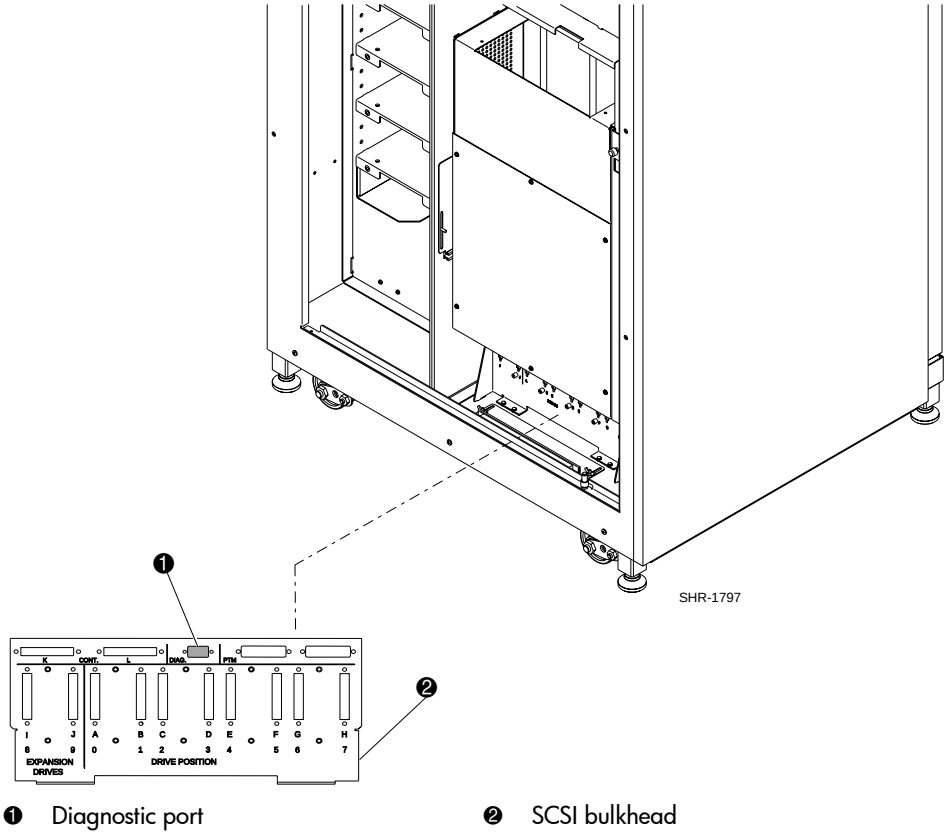
To calibrate the PTM using the control panel on the Master Library.

1. From the **Multi Unit** tab, touch the **Calibrate all PTMs** button. All of the PTMs in all of the libraries are now automatically calibrated.
2. Once calibrated, place each library On-Line starting with the slave units from right to left. Bring the master unit On-Line last. When the master library comes on-line, it issues a **MODE SENSE** command and retrieves configuration information from the slave libraries. When complete, all libraries read on-line from the control panel.

Configuring the PTM using diagnostic software

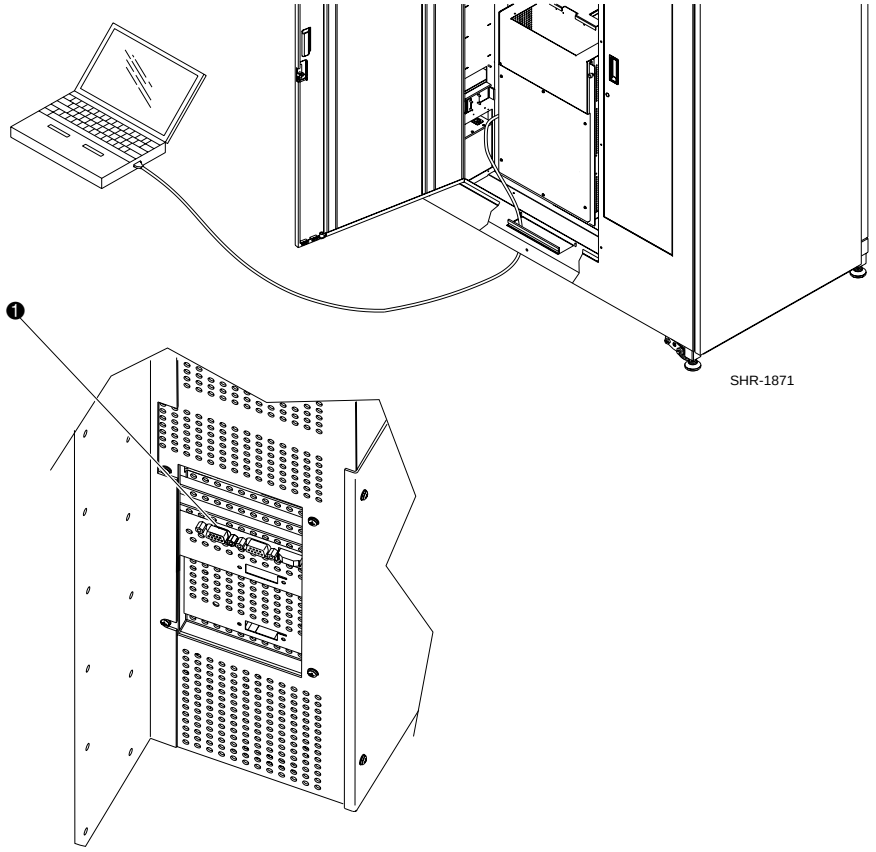
To configure a PTM using the diagnostic port:

1. Connect a diagnostic PC to the library using a RS-232 DB9 connector (see Figure 37 for single drive column models and Figure 38 for dual drive column models.



❶ Diagnostic port ❷ SCSI bulkhead

Figure 37: Diagnostic port connection (ESL9198 shown)



❶ Diagnostic port (left side of tape library)

Figure 38: Diagnostic port connection (ESL9326 shown)

2. Launch the diagnostic software from a PC.

Caution: This procedure must be done using the control panel or diagnostic software any time a PTM is added or removed from a multi-unit library system.

3. From the **User Test** menu, select **User Input Cmd**.
4. Enter your password. The case-sensitive default is “LIBDIAG”.
5. After the command line dialog box appears, type:

```
CONFIG PASSTHRU_____(None/Left/Right/Both)
```

Configuring a multi-unit library system using diagnostic software

To configure libraries in a multi-unit system using diagnostic software:

1. Launch the diagnostic software on the PC.
2. From the **Config Menu**, select **Multiple Unit**.
3. From the **Multi-Unit** sub-menu, select **Master Unit** or **Slave Unit** for the library configuration. The library connected to the host is the master library. Any library in the multi-unit library system can be a master. The remaining libraries are slaves.

Caution: When configuring multiple libraries in MUSL mode, there can be only one master library.

4. After selecting **Master Unit** or **Slave Unit**, enter the Unit # (0-4) for the library and # Units (1-5) for the number of libraries in the multi-unit library system.
5. Repeat step 1 through step 4 for all the libraries in the multi-unit library system.

Calibrating the PTM using diagnostic software

To calibrate the PTM using diagnostic software:

1. Ensure the diagnostic PC is connected to the Master Library.
2. From the **Align/Calibrate** menu, select **Calibrate**.
3. Select either **Selected PTM** (left or right in a particular library) or **ALL PTM**.
4. Select **ALL PTM** to automatically calibrate all the PTMs in all of the libraries.

Bringing the multi-unit library system online

Before bringing the multi-unit library system on-line, check the configuration of each individual library to ensure that their settings are correct. Set each library to **System On-line** using the control panel starting with the right-most library and continuing to the last library on the left. This eliminates any possibility that one library could inventory an adjacent library with a populated PTM before the adjacent library can retract its PTM to its home position

When the master library comes on-line, the master library issues a **MODE SENSE** command and retrieves configuration information from the slave libraries. When this action completes, all libraries will read online from the control panel.

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